A9385-13F

Instructional Applications of Information Technologies

A Survey of Higher Education in the West

WICHE PMN

Instructional Applications of Information Technologies:

A Survey of Higher Education in the West

by

Raymond J. Lewis, Director
Learning and Technology Services

with

Richard Markwood, Senior Staff Associate
Western Interstate Commission for Higher Education

A Project of the
Western Interstate Commission for Higher Education
and the
Pacific Mountain Network

Funded by the
Annenberg/CPB Project

The Western Interstate Commission for Higher Education (WICHE) is a nonprofit regional organization. It helps the fourteen member and affiliate states to work together to provide high-quality, cost-effective programs to meet the education and manpower needs of the West. Member states are Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. North Dakota is an affiliated state.

Pacific Mountain Network (PMN) is a regional membership organization of public broadcasting licensees and state and local education agencies from the same western states that are members of WICHE. Through its Learning Services Division, PMN works with educators to provide quality broadcast programming for instructional purposes.

This report is funded by the Annenberg/Corporation for Public Broadcasting Project, contract number 1806/80494. The opinions or policies expressed in this report are those of the authors and do not necessarily reflect the opinions of the Corporation for Public Broadcasting. In addition to this report, this Annenberg/CPB contract supported the Adult Learning/Information Technologies Survey Report which was administered by PMN to western public broadcasting stations. Copies are available from PMN, Suite 170B, 2480 West 26th Avenue, Denver, Colorado 80211.

Acknowledgments also are extended to the M.J. Murdock Charitable Trust and the Northwest Area Foundation for their support of this project in its initial stages. The M.J. Murdock Trust sponsored a separate report on the survey data from the five states in the Pacific Northwest; copies of that survey report are available from WICHE.

Published July 1985
Western Interstate Commission for Higher Education
P.O. Drawer P
Boulder, Colorado 80302
(303) 497-0200
An Affirmative Action/Equal Opportunity Employer
Publication Number 2A143
Printed in the United States of America
40100564000401:750:0785:WICHE:2A143

Contents

		Page
	Acknowledgements	v
	Introduction	1
I.	The Surveys: Why Were They Conducted?	2
II.	Observations: A Summary of Survey Findings	4
III.	Implications of the Survey Findings	12
IV.	The Institutional Survey	20
V.	The SHEEO Survey	48
VI.	State Summaries	57
VII.	Appendices	
	A. Methodology	106
	B. Institutional Survey Questionnaire	109
	C. SHEEO Survey Questionnaire	119
	D. Northwest Task Force on Higher Education Information Technologies Membership List	129

Acknowledgments

This report is the result of activities that have involved many individuals.

Richard Markwood, senior staff associate at the Western Interstate Commission for Higher Education (WICHE), made significant improvements in both the form and substance of the institutional survey questionnaire that I designed for this project. In addition, he took the lead in the development and administration of the State Higher Education Executive Officer (SHEEO) survey. He supervised the distribution of the institutional survey instrument as well as the coding and keypunching of the data. He also organized and conducted the computer analysis and consulted with me on certain aspects of the data interpretation. I greatly appreciate his contributions to the project and the opportunity to work together with him.

Richard Jonsen, deputy director of WICHE, has guided this project from its inception. He was instrumental in organizing the Northwest Task Force on Higher Education Information Technologies which initiated the first stages of this research project. He did a marvelous job of coordinating the various components of this project as well as the project's relations with all the participating organizations, states, and funding agencies.

Mary Lou Ray, vice president of Learning Services for Pacific Mountain Network (PMN), also played a major role in coordinating the project's relations with broadcasters, states, and funding agencies. In addition, she made many helpful suggestions during the questionnaire design stage.

The Northwest Task Force on Higher Education Information Technologies (listed in Appendix D) is composed of numerous representatives from the five northwestern states. They not only made many helpful suggestions during the project design phase but they also encouraged their colleagues to return completed questionnaires. They have very generously given of their time to encourage this project and other collaborative efforts to make more effective instructional use of information technologies in the region.

Mollie McGill, staff associate at WICHE, has assisted Dick Jonsen, Dick Markwood, and me in various aspects of this project. She played a central role in putting together the state summaries and in supervising the final preparation of the report for publication.

Cheryl Pedersen, Sara Rademacher, Mary Sloan, and Katy Wogan, secretarial staff at WICHE, provided excellent secretarial support throughout this project, from the layout of the questionnaires and recording of information to preparation of the final, typed manuscript and tables.

This report was funded by the Annenberg/Corporation for Public Broadcasting Project. We are very grateful to Hyman Field and his colleagues for their support. The Northwest Area Foundation provided early support of this activity and we would like to thank Martha Butt of the Foundation for her personal involvement. The M.J. Murdock Charitable Trust supported the survey of the five northwestern states. We are grateful to Ray Honerlah of the Murdock Trust for his support in this effort.

Finally, I want to thank those individuals at the 344 colleges and universities and the staff of the 13 SHEEO agencies that contributed their time and effort to this ambitious information-gathering task. Both the quality and quantity of the responses were very impressive.

Raymond J. Lewis

Introduction

This report is based on an analysis of two surveys. The first is a survey of colleges and universities in the 13 western states that belong to the Western Interstate Commission for Higher Education (WICHE). These are also the states from which the Pacific Mountain Network (PMN) draws its membership of public broadcasting agencies. Respondents from 344 of the 575 public and private postsecondary institutions in the region completed the survey during the spring and summer of 1984. The respondents of the second survey are the staffs of the State Higher Education Executive Officer (SHEEO) agencies in 12 of the states. The State of Wyoming does not have such an agency; therefore, the survey was completed by administrators at the University of Wyoming who are familiar with statewide activities related to information technologies.

The report is organized to serve the needs of individuals with varying degrees of interest in how colleges and universities are using video, audio, and computer technologies for instruction. Since not everyone is equally interested in reading detailed descriptions of survey research data, the report gives the reader the option of focusing either on summary information or on more detailed analysis. Section II summarizes major findings and section III describes what the author sees as some of the implications of these findings. Sections IV and V provide detailed analyses of the results of the institutional and SHEEO surveys, respectively. These sections also include numerous tables which present data for the region as a whole. The unit of analysis is either the responding institutions (Tables 1-27) or responses from the SHEEO agencies (Tables 28-34). Data are reported either as numbers or percentages of responses. State-by-state summaries of selected data, including a listing of institutions from each state which responded to the survey, are found in Section VI.

I. The Surveys: Why Were They Conducted?

The information technologies surveys and this report are outgrowths of a WICHE project--the Graduate Education Project--which was initiated in the five states of the Pacific Northwest through an initial grant from the Carnegie Corporation of New York and more recently supported by the Northwest Area Foundation. Through its work with higher education leaders serving on the Graduate Education Project's advisory committee, WICHE had become interested in the policy issues surrounding the expanding use of video, audio, and computer technologies in higher education and the appropriateness of interinstitutional and interstate cooperation as a means to address some of the issues.

In light of this situation, WICHE staff consulted with representatives of colleges and universities from the five northwestern states (Alaska, Idaho, Montana, Oregon, and Washington) and with staff of the Pacific Mountain Network (PMN), a regional association of public broadcasting agencies in the West. There seemed to be sufficient interest in these issues to warrant undertaking efforts separate from, but complementary with, those of the Graduate Education Project.

In June of 1983, WICHE and PMN brought together a group of educators from northwestern colleges and universities to discuss common issues and problems related to information technologies. This group later formed the core membership of the Northwest Task Force on Higher Education Information Technologies. One of the first goals the task force set out to accomplish was to get an accurate picture of current technology-based instructional practices and problems in the northwest region.

The task force decided the best way to obtain such information was to survey all colleges and universities in the five northwestern states. They wanted the survey results to serve the following purposes:

- to describe current instructional applications of video, audio, and computer technologies,
- to facilitate networking among educators who share common concerns,
- to identify obstacles to more effective use of information technologies, and
- to determine on what types of problems educators would like to work collaboratively with colleagues at other institutions.

Before this activity (which was funded by the Northwest Area Foundation and the M.J. Murdock Charitable Trust) was fully underway, WICHE and PMN entered into discussions with the staff of the Annenberg/Corporation for Public Broadcasting Project regarding the possibility of extending the survey to all 13 western states that make up the membership of both agencies. In view of the many common geographic, economic, and educational characteristics of the states in the region, it seemed to make sense to attempt to gather the data from all higher education institutions in the West. The Annenberg/CPB Project agreed to support the costs of conducting the survey in the other eight states not already included in the northwestern survey.

In order to gain additional insight into some of the policy issues related to the use of information technologies, WICHE and PMN also decided to survey the State Higher Education Executive Officer in each state. The SHEEO survey focused less on specific applications of technology and more on policy issues related to the educational use of information technologies. Many of the same questions appeared on both the institutional and the SHEEO survey instruments. Both surveys were conducted in mid-1984.

The third component of the WICHE, PMN, and Annenberg/CPB regional data collection project is a survey of PMN's member broadcasting stations. Complementary to the two surveys described in this report, the station survey was completed by 35 of the 39 public television stations in the West. The report of that survey is available from PMN in Denver, Colorado.

II. Observations: A Summary of Survey Findings

This section highlights some of the major findings of both the institutional and SHEEO surveys. More detailed analyses, including tables, are presented in the two subsequent sections.

A. Information Technologies

The survey reveals that educators in western states are using a wide variety of information technologies for instructional purposes. Even though they have a full menu of sophisticated instructional technologies available to them, these educators still make most extensive use of some of the least complex information technologies. For example, the survey reveals that cassettes--both video and audio--are among the technologies most heavily used by educators; 85 percent of the responding institutions use video cassettes for on-campus instruction and 66 percent use audio cassettes on campus. Slides and overheads are also frequently used.

Not surprisingly, the survey indicates that computer-based instructional applications are used by many educators in the western states; only 10 percent of the institutions (n=304) do not report using microcomputers for instruction. (The percentage of non-users may be even smaller because the question did not refer to computer science students.) The survey findings also reveal that a substantial percentage of educators are combining computers with various video and audio technologies (e.g., videotape and telephone).

Other findings about the extent of instructional applications of video, audio, and computer technologies follow:

- After video cassettes and slides/overheads, the video technologies used most for on- and off-campus instruction are one-way cable television (22 percent on campus, 17 percent off campus) and public broadcast television (27 percent on campus, 24 percent off campus). Closed-circuit television is heavily used on campus (31 percent).

- Among the interactive video technologies (excluding combinations of video and computer technologies), one-way video teleconferencing (with two-way audio) is used by the largest number of institutions (9 percent for on-campus instruction, 3 percent for off-campus instruction); less than 7 percent of the surveyed institutions are using other interactive technologies such as interactive cable, point-to-point microwave, videotext, or two-way video teleconferencing.

- Telephone-based technologies are heavily used for instruction by educators in the western states. Seventeen percent of the institutions use audio teleconferencing on campus; 10 percent use it off campus. On- and off-campus instructional applications of regular telephone service is 15 and 12 percent, respectively.

- Public FM radio is used for on-campus instruction by 11 percent of the colleges and for off-campus instruction by 7 percent.

- Seventy-one percent of the surveyed institutions use computer-assisted instruction (CAI) on campus; 12 percent use it off campus.

- After CAI, the computer technologies used most for on-campus instruction are on-line bibliographic searches (43 percent), simulation/gaming (39 percent), computer-managed instruction (33 percent), and computer-assisted design (32 percent).

- The computer applications used most to serve students off campus are computer-assisted instruction (12 percent), electronic mail (10 percent), and on-line bibliographic searches (8 percent).

- As many as 17 percent of the surveyed institutions are using combinations of two or more information technologies to deliver instruction to students; among the technologies most often combined with others are broadcast or one-way cable television, video cassettes, audio teleconferencing, telephone, and computers.

- There is a strong positive relationship between the enrollment size of a college or university and the likelihood that it uses video, audio, or computer technologies for instruction.

- Among two-year and baccalaureate institutions, public colleges and universities make more extensive use of information technologies than do private institutions.

B. Instruction

The following are selected findings regarding student population, curriculum areas, courseware production, and institutional initiatives:

- In general, computers are being used to serve larger proportions of the student body than either video or audio technologies.

- Not surprisingly, the survey finds more use of computers in the scientific disciplines and more use of audio and video in the social sciences and humanities. Among the professionally-oriented curriculum areas, business is the heaviest user of information technologies, followed by engineering, medicine, and law.

- White-collar professionals are the single largest category of students served via information technologies; 23 percent of the institutions serve them on campus, 26 percent serve them off campus.

- Thirteen percent report using information technologies to reach rural adult learners in off-campus settings.

- A relatively small proportion of the institutions in the region report they produce print or electronic courseware for lease or purchase by other institutions--17 percent produce video telecourses (n=299), 7 percent produce audio telecourses (n=285), and 21 percent produce computer software (n=291).

- Faculty orientation and training in the use of information technologies is provided by 84 percent (n=309) of the surveyed institutions. One-third (n=319) offer special rewards and incentives to get faculty involved in the use of information technologies.

- Two-thirds of the surveyed colleges and universities have created task forces or study groups to assess institutional policies and plans regarding information technologies (n=331).

C. Collaborations

Institutions in the western region are active participants in technology-oriented networks:

- Nearly one-half (47 percent, n=313) of the responding institutions belong to one or more information technology networks or consortia.

- Computer networks and video telecourse consortia are the most common technology-oriented collaborative activities in which the surveyed institutions participate.

- Thirty-seven percent of the institutions have informal or formal working relationships with public television broadcast agencies (n=324); one-fifth (21 percent) have such relationships with public radio broadcast agencies (n=317).

D. State and Institutional Policy Issues

The state higher education authority (SHEEO) in each state responded to questions which deal with the level of state activity and awareness of higher education's use of information technologies. Findings from the SHEEO survey include:

- SHEEO staff report having more knowledge about administrative applications of information technologies--particularly computers--than they have about instructional applications; 92 percent report having a working or comprehensive knowledge about the use of computers for administration.

- Forty-six percent of the SHEEO respondents indicate they have minimal knowledge about the instructional applications of computer and audio technologies; 38 percent have minimal knowledge about video for instructional purposes.

- Eight of the 13 western states have established statewide task forces to deal with information technologies in general.

- Only three states have developed a statewide master plan for information technologies in higher education.

1. Obstacles to Effective Use of Information Technologies

Institutional and SHEEO respondents agree that inadequate financial resources to obtain necessary hardware and courseware is the greatest obstacle impacting institutions' ability to effectively use information technologies. This item was ranked the number one obstacle by 95 percent of the responding institutions (n=333) and by all of the SHEEOs.

In general, both survey groups perceive issues internal to higher education as more significant obstacles than ones related to external actors, such as state policy makers, cable operators, and public broadcasters. While the institution-related issues stand out as the primary obstacles, college and SHEEO respondents agree that (1) inadequate knowledge about information technologies on the part of state policy makers and (2) inadequate advice and support from policy makers are hindrances. Institutional responses to these two items are 62 percent (n=261) and 63 percent (n=259), respectively; these items elicited slightly higher responses from the SHEEOs--69 percent and 77 percent, respectively.

Institution and SHEEO respondents have different perceptions about whether a lack of cooperation among colleges is an obstacle to effective use of information technologies. Eighty-five percent (n=13) of the SHEEO agency respondents view this as a problem, compared with only 36 percent (n=278) of the college respondents. Other findings related to obstacles from the institutional survey follow:

- Eighty-three percent (n=318) indicate that failure of the incentive and reward system in encouraging faculty to get involved with information technologies is an obstacle to effective use of these resources.

- Lack of adequate courseware and lack of adequate courseware evaluation information are seen as hindrances by 82 percent (n=313) and 74 percent (n=301) of the institutional respondents, respectively.

- Faculty resistance to audio and video technologies is reported to be more of a problem than faculty resistance to computers.

- Faculty resistance to computers is seen as less of an obstacle at colleges that make extensive use of computers for instruction than it is at institutions that make low or moderate use.

- On virtually all policy issues, considerably larger percentages of video telecourse users indicate a given issue is important than do their non-user colleagues; the same pattern holds true among colleges that do and do not have working relationships with public broadcast agencies.

2. Actions State Policy Makers Might Take

The actions respondents most want state policy makers to take are (1) to provide additional financial support for acquisition of hardware and software (89 percent, n=316), to devise incentive programs to encourage greater faculty involvement in information technologies (81 percent, n=310), and (3) to encourage collaborative use of information technologies by numerous institutions (81 percent, n=304).

All SHEEO respondents report that, from their perspective, it would be important or very important to colleges if state policy makers would implement policies encouraging collaborative use of information technologies by groups of institutions.

3. Actions Public Broadcasters Might Take

Respondents most want public broadcasters to (1) provide additional means of distributing courseware, such as video cassettes, satellites, videodiscs, etc. (78 percent, n=273), (2) develop telecourse production projects in collaboration with colleges and universities (78 percent, n=277), and (3) increase incentives for collaboration among colleges and universities (74 percent, n=283).

In general, two-thirds to three-quarters of the responding institutions want more of the services that public broadcasters provide.

4. Areas for Potential Collaboration

Information sharing and networking are viewed as important areas for collaboration by college and university respondents. Ninety-seven percent (n=322) rate information sharing as an important collaborative activity, and networking with colleagues about instructional applications of information technologies is considered important by 88 percent (n=314).

Collaborative efforts to provide orientation and training for faculty are a high priority for 92 percent (n=324) of the institutions.

Among users of video telecourses and institutions that work with public broadcasters, there is greater interest in collaboration for the purposes of acquiring, developing, previewing, evaluating, and using courseware than among non-telecourse users and colleges that do not work with public broadcasters.

Not surprisingly, institutions that make extensive use of computers for instruction are more supportive of the need for networking with colleagues at other institutions, and for shared preview and evaluation of software than are those institutions making little use of computers.

E. Responses to Open-Ended Questions

1. Problems Encountered in Using Information Technologies

In response to an open-ended question about problems encountered by institutions in their efforts to use information technologies, the respondents emphasize three major areas. First, and foremost, they state that the lack of funds hinders their efforts to use information technologies. Second, they stress a wide variety of "people problems" within their institutions. Third, they mention various inadequacies in the current state of technology.

The respondents cite the following topics (the number of references to each problem area is included in parentheses):

- Lack of adequate funds (60)
- Lack of faculty, staff, and outside expertise (21)
- Lack of equipment, space, or access to technological resources (16)
- Lack of faculty and staff time (15)
- Resistance and apathy from faculty and staff (14)
- Lack of interest and support from institutional leadership (10)
- Lack of institutional planning for information technologies (10)
- Lack of adequate courseware (10)
- Technical problems (7)
- Software management issues, such as acquisition, development, evaluation, coordination (6)
- Logistics of rural outreach (5)
- Inadequate support and assistance from state government (5)
- Lack of information (4)
- Student resistance to technology (3)

2. Curriculum Areas Where More Courseware Is Needed

In response to an open-ended question about curriculum areas where more technology-based courseware is needed, the respondents focus most heavily on five areas: physical sciences, business, humanities, math, and social sciences.

The curriculum areas cited include the following (the number of references to each curriculum area appears in parentheses):

- Physical sciences (47)
- Business (38)
- Humanities (33)
- All curriculum areas (33)
- Math (29)
- Social sciences (28)
- Computer science, literacy (18)
- Medical, allied health (17)
- English literature, language arts communication (14)
- Basic skills (math, reading, writing, ESL) (14)
- Fine arts (13)
- Vocational/technical (11)
- Engineering (11)
- Foreign languages (10)
- General education (6)
- Electronics (6)
- Religion (5)
- Agriculture, forestry (5)
- Education (5)
- Upper division, graduate courses (5)
- Liberal arts (3)

3. Future Plans for the Use of Information Technologies

In response to a question about short-term and long-term institutional plans, most respondents indicate they plan to make more extensive use of information technologies in the future. By far, the greatest emphasis is on the computer and other interactive technologies. There are fewer references to noninteractive applications such as video telecourses. Many of the responses suggest colleges are increasingly interested in alternative delivery systems (e.g., cable, satellite, microwave, and ITFS).

The most commonly cited future plans include the following (the number of respondent references to each plan is included in parentheses):

- Develop own courseware (28)
- More off-campus outreach (23)
- More use of technology (21)
- Acquire hardware (17)
- Faculty, staff development (14)
- Integrate technology into college (14)
- Acquire courseware (10)
- More telecourses (10)
- Collaborate with other organizations, institutions (9)
- Establish or expand local area computer network (7)
- Establish or expand computer labs (6)
- Integrate video, audio, and computer technologies (5)
- Establish or expand technology literacy program (4)
- Establish or expand library applications of technology (3)
- More use of interactive technology; greater access to technology for faculty, staff, students (2)

The technologies most commonly mentioned for future applications include the following:

- Cable TV (23)
- Computers, microcomputer (21)
- CAI (15)
- ITFS (14)
- Satellite (13)
- Microwave (11)
- Teleconferencing (10)
- Interactive video (6)
- Videodisc (5)
- Video cassette (5)
- Computer graphics (4)
- Electronic mail (4)

4. Policy Areas About Which SHEEO Respondents Feel the Need for More Information

Some of the policy issues related to information technologies that SHEEO respondents feel they need more information about include transfer of credit for technology-based courses, accreditation practices related to instructional programs delivered by information technologies, and financing practices.

5. Topics Which SHEEO Respondents Feel Need More Research and Analysis

SHEEO respondents indicate that the topics related to information technologies that most need additional research and analysis include the following: comparisons of the effectiveness (in terms of learning outcomes, costs, etc.) of instruction using conventional practices and instruction using information technology, and comparisons of the effectiveness of alternative technological delivery systems.

III. Implications of the Survey Findings

The clearest impression one gets from the survey results is that information technologies are having some impact on virtually every aspect of academic life. No longer is it appropriate to speak of instructional technology or computing as isolated activities tucked away in the corners of the institution. When 67 percent of the responding institutions report they have created task forces or study groups to assess policies and plans regarding information technologies, something important is going on.

The survey results give us a great deal of information about current practices, persistent problems, and potential solutions. However, unless we attempt to put this information in some sort of perspective, it can be difficult to determine what significance all this technological activity has for higher education in the West.

Different readers of this information will come to varying conclusions about its meaning. In this section I will describe what I see as some of the implications, based largely on the survey findings but also on earlier interviews and discussions held with educators in the region. I will focus separately on implications for different entities involved in higher education--colleges and universities, states, the western region, public broadcasters, and funding agencies.

A. Colleges and Universities

Institutions of higher education are generally slow to change, regardless of whether the impetus comes from the center or the periphery of the institution. Nevertheless, there is considerable evidence in the literature of higher education that the expanding presence of computer, audio, and video technologies in colleges and universities is stimulating a wide variety of changes that probably would not otherwise occur. This report supports such a conclusion and, in this section, highlights some of those changes.

Ideally, we would like to have sufficient data to assess the educational value of these information technologies to higher education. Unfortunately, for the time being, we must proceed without such information.

We can comment on the apparent significance of the administrative and instructional developments stimulated by computer, audio, and video technologies. Some of the changes are little more than superficial adjustments to new technological developments, like other transitions in the past. However, there are other changes that impact on the very core of the academic enterprise; these are the developments we are most interested in exploring.

Many educators have been rather innovative in the ways they have responded to the challenges posed by their increasingly technological environment. For example, colleges have joined with one another (and with business and community organizations) in collaborative arrangements to access scarce and expensive technological resources (e.g., computers, cable television, satellites). The survey reveals that almost half the responding institutions participate in such

collaborative arrangements. Anyone familiar with the problems of achieving significant cooperation among colleges can appreciate the importance of this pattern.

Professional development for faculty is another of the areas where information technologies are stimulating changes that would otherwise be unlikely to occur. In spite of a history of apathy or resistance to information technologies, a growing number of faculty are experimenting with hardware and software tools; these are resources that have the capacity to substantially alter their roles as teachers and scholars. At many colleges, new types of student/faculty relationships are forged because educators have discovered that many students possess technological skills that can assist faculty in their teaching and research.

One of the more noticeable recent developments on college campuses has been the establishment of broadly representative committees, task forces, and study groups engaged in long-term strategic planning. The complexity of many of the issues raised by recent and anticipated changes in the information technology industry is responsible, in part, for much of the growing popularity enjoyed by the strategic-planning concept in higher education. The deliberations of these strategic-planning groups may well improve the capacity of colleges and universities to adapt to changes of all kinds in their environment.

The fact that so many of the surveyed institutions are serving students in off-campus settings is due, in large measure, to the special capabilities of computer, video, and audio technologies. To the survey question about future plans, the second most frequent reply from respondents is that they intend to use technology to expand their outreach efforts. The ability of colleges to fulfill their outreach commitments, and in some cases to survive financially, may depend on how effectively they can use information technologies to extend the services of the campus into the community.

There are numerous other significant changes going on in the academic community that have been stimulated by information technologies; not all of them are documented by the survey results. For example, the digitalization of information is drastically changing the role of the library and is beginning to establish new lines of communication among faculty, administrators, and students. These developments obviously have important implications for the future of colleges and universities.

One of the most unmistakable impacts information technologies are having on colleges is financial in nature. Survey respondents make it clear that the costs of acquiring and maintaining hardware and software resources are causing them great difficulty. They see this issue as the greatest obstacle to more effective use of information technologies.

However, the impact goes far beyond. Traditional budgetary practices at most institutions make it difficult to obtain funds for large up-front capital investments; the problem is intensified when the item purchased may be obsolete within a few years. At many institutions information technology budgets are growing at the expense of other programmatic areas. How an institution deals with the peculiar financial requirements of information technologies will

clearly affect the distribution of resources for all the organization's activities. The survey respondents made it clear they want assistance from state policy makers in their efforts to solve these problems.

It is also apparent from the survey results that educators are unlikely to successfully integrate information technologies into colleges unless they give the faculty incentive and reward system a great deal more attention. In view of the extra faculty time that is inevitably required to make effective instructional use of computer, audio, or video technologies, colleges are unlikely to realize the potential of their investments in technology unless they provide their faculty with appropriate incentives and rewards. It is unrealistic to expect that by merely making faculty technologically literate an institution has done what is necessary to adapt to the demands of an information society. As long as teaching and the development of new approaches to instruction are not sufficiently valued, or at least underrewarded, instructional applications of information technologies are unlikely to extend far beyond those faculty who are predisposed to technology.

In the survey we find ample evidence of the growing tendency of educators to combine two or more technologies to accomplish their instructional objectives. We also learn that faculty resistance to video and audio technologies is more of a problem than resistance to computers. In view of these findings, institutions may want to consider building on the more positive faculty attitudes toward computers to help overcome some of the historical resistance to video and audio technologies. By stressing "technological literacy" rather than merely "computer literacy," colleges may be better prepared to take advantage of interactive video (e.g., videodisc, videotext, video teleconferencing) and telephone-based technologies (e.g., audio teleconferencing, slow-scan television, data transmission via telephone and computer).

Finally, we should not overlook a discrepancy between the perceptions of college and SHEEO respondents. College respondents indicate they do not feel that unwillingness of institutions to cooperate with one another (for purposes of using information technologies) is a problem. However, most SHEEO respondents do see it as an important problem. There are undoubtedly many explanations for this discrepancy. Nevertheless, institutional leaders need to reexamine their perceptions about their colleges' commitment to interinstitutional cooperation.

B. States

The results of both the institutional and the SHEEO surveys leave little doubt about the need for state policy makers to learn more about how educators use information technologies. In particular, they need to become more knowledgeable about instructional applications of information technologies. Given the magnitude of the changes at colleges that are stimulated by the technologies, it is important for state policy makers to understand the long-term implications of decisions made at the state level.

The nature of the relationship between colleges and state agencies like SHEEOs is likely to change as more instruction is delivered by technological systems that span traditional institutional and state boundaries. As

large-scale delivery systems become more common, colleges will need to cooperatively manage such resources to the satisfaction of all interested parties. Alternatively, state agencies may be urged to become more involved in such coordination.

The traditional relationship between the institution and the state higher education authority may also change as the proliferation of programming delivered across state lines continues. States may need to enter into more interstate agreements and work more closely with federal agencies like the FCC and the FTC. Such developments would undoubtedly have impacts on colleges.

Relationships between state agencies and private institutions are likely to get more complicated as independent colleges and universities become more involved with delivery systems that cut across state boundaries and as states get more involved in coordinating statewide delivery systems.

As increasing use of information technologies makes time and place less important, the appropriateness of traditional measures of instructional activity (e.g., student/teacher contact hours, residency) will be further undermined. This situation is likely to put increasing pressure on state policy makers and institutions to focus on measures of learning outcomes as a basis for the allocation of funds.

Another funding issue concerns the special budgetary problems information technologies cause for colleges. As we discussed in the institutional section, the large costs of information technologies and the need for up-front capital complicate the financing of higher education. This is also a problem that confronts state policy makers who must decide how to fund public institutions, as well as institutional leaders who must deal with its consequences at the campus level. Survey respondents are clearly asking for help with these problems from state policy makers.

It is apparent from the responses to the open-ended question about future plans that the information technology picture in all states is likely to get much more complicated. Many colleges are now sufficiently comfortable with information technologies to plan and implement (if funds are available) delivery systems that reach far beyond their traditional turf boundaries. They may undertake such efforts alone, in concert with other institutions or organizations in the state, or as part of an interstate collaboration. In the absence of planning and coordination at the state level, the long-term outcome of such initiatives may be an inefficient use of limited educational resources and an inappropriate distribution of technological resources in the state.

Eight of the SHEEO agencies report the existence of a statewide task force dealing with information technologies. In addition to initiating such efforts, it seems appropriate for state agencies to play an active role in the development of statewide technology plans and technology networks (e.g., computer, microwave, audio teleconferencing, etc.).

If higher education is experiencing a technology revolution, it certainly began as a grass roots movement. In most cases, state policy makers have been observers of the rapid changes occurring at the institutions in their states. As educational applications of information technologies increasingly expand beyond the individual institution to statewide, regional, and national delivery systems, state agencies are unlikely to want to sit on the sidelines. However,

getting sufficiently involved in all of this to exercise some degree of influence will require significant allocation of staff resources to acquire expertise and to execute the necessary planning.

C. The Western Region

In reviewing the responses to the institutional and the SHEEO surveys one cannot help but notice how similar the problems and concerns are across the region. It would be unfortunate if institutions and agencies in each state were left to struggle with these issues in isolation from their peers in the region. Given the geographic, economic, and educational similarities within the region, it makes sense to look for strategies that address common needs.

Colleges and the states have the ultimate responsibility for making policy decisions about information technologies. What seems to be needed at the regional level are efforts to (1) encourage communication among interested educators, (2) facilitate the design of effective policies, and (3) initiate collaborative projects that address regional needs.

The survey results suggest a number of ways in which regional collaboration can be of assistance. Survey respondents express a great deal of support for information sharing and networking activities among educators facing similar problems. The data on which this report is based is a solid resource for making some of these kinds of linkages. We not only know which colleges are using particular technologies, we also know about which problem areas they are most concerned. At this point all that is required are mechanisms for informing and linking educators in the region so that they can, if they choose, communicate with one another via electronic or conventional means.

Some technology-related projects seem to be most appropriately undertaken at a regional level. For instance, many institutional respondents express concern over the inadequacy of courseware evaluation information. A regional effort to gather and disseminate descriptive and evaluative information about available courseware would undoubtedly be welcomed by educators.

Orientation and training for state policy makers is another activity that might best be addressed by a regional project. Both institutional and SHEEO respondents indicate state policy makers have inadequate knowledge about information technologies. They consider this situation an obstacle to more effective educational use of technology.

Some interstate agreements permitting shared use of information technology resources are already in place (e.g., Idaho and Oregon). Since institutions seem to be increasingly interested in larger scale technological delivery systems, there may well be the need for regional activity to facilitate additional agreements among two or more states in the West.

In their answers to the open-ended questions, SHEEO respondents specify a number of topics they feel deserve further research and analysis (e.g., comparative analyses of the effectiveness of alternative technologies). Whether

or not such research is conducted by individual colleges or regional organizations, there may be a need at the regional level to identify pertinent research topics, to link researchers interested in similar topics, and to disseminate research findings.

Similarly, some of the problem areas identified by both institutional and SHEEO respondents might be appropriately addressed by regional task forces or study groups that would share the results of the deliberations with other educators in the region. Some topics that fit this description include (1) the faculty incentive and reward system, (2) the faculty development process, (3) information technology budgetary issues, and (4) the special information technology needs of small and rural colleges.

SHEEO respondents indicate they most want help at the regional level to develop (1) model policy guidelines for states, (2) model policy guidelines for institutions, and (3) model planning for institutions. These are some of the types of activities that could be more efficiently undertaken at the regional level.

Many of the SHEEO respondents also endorse the idea of regional task forces of educators to (1) identify problems, (2) initiate region-wide activities, and (3) seek project funding to deal with those problems. Once formed, such groups could also support information sharing and networking functions. Some SHEEO respondents specifically mention the Northwest Task Force on Higher Education Information Technologies as an example of the type of regional effort they have in mind.

D. Public Broadcasters

Most educators do not see public broadcasters as obstacles to effective use of technology; in addition, they want more, not less, of the services public broadcasters have to offer. The problem is, of course, that most of the service expansion or enhancement educators want costs more money.

Over 70 percent of the institutional respondents indicate that it would be important to them if public broadcasters would (1) provide additional means of distributing courseware, (2) develop telecourse projects in collaboration with colleges, and (3) provide colleges with increased incentives for collaboration. Each of these represent areas in which many public broadcasters would also like to see improvement. Unfortunately, all these issues are difficult to address in view of financial constraints currently facing public broadcasters and educators alike.

In the long run, perhaps the most critical issue affecting the relationship between educators and public broadcasters has to do with the requests from educators for additional means of delivering technology-based courseware. As public broadcasters make their own adaptations to developments in the communications industry (e.g., computers, video cassettes, videodiscs, videotext, ITFS, fiber optics, cable television, satellites, telephones, etc.), they would do well to give careful attention to the variety of ways educators are combining two or more technologies to enhance their delivery systems.

Regional task forces, study groups, or networks of interested educators and public broadcasters might be able to help both communities evolve new ways of working together to deliver instruction. If such collaboration does not occur, it is likely that educators will seek alternatives that might not involve public broadcasters. This is not a situation that will get better by ignoring it.

E. Funding Agencies

Even though the use of information technologies is only one thread in the complex fabric of higher education, the survey results suggest that this is an area that poses some special problems for colleges and universities. Probably the most difficult problem is that integrating information technologies into a college is expensive; it costs money to acquire and maintain equipment, and it costs time for faculty to make effective use of it. Whether or not a funding agency decides to support these kinds of costs, its decision makers should recognize that these special problems do exist. One way of addressing this problem without necessarily supporting the cost of hardware, software, or faculty release time would be to assist one or more institutions in their efforts to devise long-term strategies for dealing with the special budgetary issues information technologies raise for colleges.

In spite of all the financial problems associated with hardware and software, institutions do seem to be creative about finding funds to support such acquisitions; a comparison of the responses to the two open-ended questions about problems and future plans is instructive. The real question is whether or not institutions will come up with the resources to overcome the human problems inherent in efforts to integrate information technologies into the college. Faculty and staff development is probably the most critical area of need. There is no way around the fact that learning to make non-trivial use of computer, video, and audio technologies takes time--much time! Unless it is made easier for faculty to learn how to make effective use of these resources, the hardware and software investments are unlikely to pay off.

The survey results dramatically illustrate the strong positive relationship between the size of an institution's enrollment and the probability that it uses information technologies. What this means for many small colleges is that, to the extent that computers and other technologies are, or are perceived to be, important indicators of the quality of instruction, small colleges are likely to be operating at a disadvantage. Small colleges that are in rural areas (a common characteristic in the West) are often doubly disadvantaged because they have difficulty attracting technically trained personnel; geographic isolation makes it difficult for computer scientists and other technical personnel to stay current in their field. Funding agencies might want to take a careful look at the information technology needs of smaller and more rural colleges.

One of the more difficult problems for individual colleges to address on their own is the lack of courseware available that meets their academic needs and standards. Over 80 percent of the respondents cite this as an obstacle to effective use of information technologies. The costs of developing computer or video courseware (print and electronic) are sufficiently high that most

colleges shy away from course development unless they have assistance from outside funding sources. Those funding agencies that do not want to support the development of individual courses could help colleges develop their capacity to produce lower-cost types of instructional materials (e.g., videotaping class sessions for remote viewing, adapting commercially available computer applications software for instructional purposes, establishing an audio teleconferencing system).

The dearth of descriptive and evaluative information about technology-based courseware is another special problem that funding agencies might want to address. Regardless of how much software is available or how excellent it is, if faculty cannot readily get access to accurate, descriptive, and evaluative information about it, they are much less likely to use it. Descriptive information is often available, but (with notable exceptions) rarely is it either comparable, convenient, or centralized. In spite of all the resources expended on marketing educational courseware, there is still very little evaluative information available. One reason for this situation is that it is not an easy problem to solve. Nevertheless, faculty need quality information about available courseware if they are to make effective use of technological resources.

IV. The Institutional Survey

A. The Colleges and Universities: What Institutions Responded to the Survey?

1. Responding Institutions (Table 1)

The survey was sent to all 575 colleges and universities (public and private) in the 13 western states. Of these, 344 (60 percent) returned a completed questionnaire. Table 1 describes the number and percentage of institutions that responded from each state.

The response rate from the colleges and universities in the five northwestern states pilot study was 76 percent. This remarkable return rate was due, in part, to the support and encouragement of the members of the Northwest Task Force on Higher Education Information Technologies. By comparison, the return rate of 55 percent from the other eight western states is much lower, yet still substantial. California, the largest state in the region with 305 higher education institutions, had a return rate of only 50 percent; even so, California surveys constitute 44 percent of the total.

2. Institution Type (Table 2)

For purposes of analysis, the responding institutions were grouped into three categories:

- Two-year--community and junior colleges
- Baccalaureate--colleges offering only BA or BS degrees
- Graduate/Professional--institutions offering graduate or professional degrees

The term baccalaureate is used here to avoid the confusion associated with the term four-year which is often applied to institutions regardless of whether they offer graduate or professional degrees in addition to BA or BS degrees. Because many of the larger public institutions offer graduate degrees, 84 percent of the institutions referred to as "baccalaureate" in this study are private colleges. Therefore, the reader should keep in mind that "baccalaureate" does not refer to all undergraduate education beyond the two-year college. Of the responding institutions, 45 percent are two-year, 13 percent are baccalaureate, and 42 percent are graduate or professional.

As the data in Table 2 indicate, nearly two-thirds (63 percent) of the responding institutions are public and over one-third (38 percent) are private. When we compare these figures to data from the United States Department of Education for the western states, we find that in the respondent population public institutions are overrepresented by about 6 percent: the public/private breakdown for the western region is 57 and 43 percent, respectively.

Table 1

Survey Response Patterns from the 13 Western States

State	Number of Eligible Institutions	Number of Responding Institutions	Response Percentage
Alaska*	15	12	80%
Arizona	29	20	69
California	305	153	50
Colorado	44	29	66
Hawaii	13	9	69
Idaho*	9	8	89
Montana*	15	10	67
Nevada	8	4	50
New Mexico	21	11	52
Oregon*	45	34	76
Utah	11	9	82
Washington*	52	40	77
Wyoming+	8	5	63
Total (5 Northwest States)	136	104	76
Total (8 Non-Northwest States)	439	240	55
Total (All States)	575	344	60

*Northwest States
+Responses from the University of Wyoming are included in the state summary found in section 6 but are not reflected in the overall report for the region due to late receipt of the completed survey.

Table 2

Institution Type

	Public	Private	Total
Two-Year	150 (96%)* (70)*	6 (4%) (5)	156 (100%) (45)
Baccalaureate	7 (16) (3)	37 (84) (29)	44 (100) (13)
Graduate/Professional	58 (40) (27)	86 (60) (67)	144 (100) (42)
Total Responses	215 (63) (100)	129 (38) (100)	344 (100) (100)

*Row percentages are listed on top and column percentages are on the bottom. Percentages may not add to 100 due to rounding.

3. Institution Size (Table 3)

The responding institutions represent a broad cross section of the higher education community in the West. Not only do two-year institutions represent the largest category of institutions (156), they also have the largest number of institutions in four of the five size categories described in Table 3. Only among institutions with fewer than 506 students do the numbers of the baccalaureate and graduate/professional categories exceed those in the two-year category.

With the exception of the smallest size category, the baccalaureate institutions constitute the smallest group in all categories. The relatively large number of graduate/professional institutions in the smallest size category apparently reflects the existence of private, graduate-only institutions with specialized degree programs.

B. Technologies: What Information Technologies Are Postsecondary Institutions Using for Instruction?

1. Video Technologies (Table 4)

The survey asked respondents to indicate which video, audio, and computer technologies their institutions use to deliver instruction to learners either on campus or off campus. In response to the question about video technologies, only 5 percent indicate their institution does not use some form of video technology for instruction.

The most heavily used electronic video technology is the video cassette. Eighty-five percent of the responding institutions use video cassettes for on-campus instruction and 32 percent use it to serve off-campus learners. These figures are higher than those for any of the other information technologies included in the survey.

In order to serve students on campus, 31 percent of the institutions use closed-circuit television, 27 percent use public broadcast television, 22 percent use one-way cable television, and 19 percent use commercial broadcast television. Ten percent of the institutions report using satellite receivers for on-campus instruction; 4 percent use them for off-campus instruction. Three percent are using videodisc technology to serve students on campus.

One-way video teleconferencing (with two-way audio) is the most heavily used interactive technology (9 percent on campus, 3 percent off campus). Other interactive technologies such as interactive cable, point-to-point microwave, videotext, and two-way video teleconferencing are used by fewer than 7 percent of the responding institutions.

Table 3

Institution Enrollment Size

	Two-Year	Bac.	Grad/Prof	Total
Less than 506	10 (14%)* (6)*	21 (30%) (48)	39 (56%) (27)	70 (100%) (20)
506-1,600	29 (42) (19)	13 (19) (30)	27 (39) (19)	69 (100) (20)
1,601-3,667	38 (55) (24)	6 (9) (14)	25 (36) (17)	69 (100) (20)
3,668-9,610	45 (66) (29)	1 (1) (2)	22 (32) (15)	68 (100) (20)
9,611-47,142	34 (50) (22)	3 (4) (7)	31 (46) (22)	68 (100) (20)
Total responses	156 (45) (100)	44 (13) (100)	144 (42) (100)	344 (100) (100)

*Row percentages are listed on top and column percentages are on the bottom. Percentages may not add to 100 due to rounding.

Table 4

Video Technologies Used

	On Campus	Off Campus	Both On and Off*
None -- 5%			
Broadcast TV, public	27%	24%	13%
Broadcast TV, commercial	19	12	6
Cable TV, one-way	22	17	9
Cable TV, interactive	4	2	1
ITFS	9	5	2
Point-to-point microwave	3	6	2
Slow-scan, freeze-frame	2	2	0
Video cassette	85	32	31
Videodisc	3	2	2
Closed circuit TV	31	2	2
Satellite-receive	10	4	2
Satellite-send	0	1	0
Videotext	3	1	1
Teletext	3	1	1
Video teleconference, one-way video	9	3	1
Video teleconference, two-way video	2	3	1
Low power TV	1	0	0
Direct broadcast TV	5	2	1
Slides, overheads	78	31	29
Other	7	3	2

*The figures for "both on and off" campus are included in the figures for "on campus" and "off campus."

2. Audio Technologies (Table 5)

Eighty-two percent of the responding institutions report using at least one form of audio technology for instructional purposes. Again we find the cassette form of the technology is most popular among educators; 66 percent use audio cassettes for on-campus instruction and 29 percent use them for off-campus instruction.

Telephone-based technologies are also used by many colleges and universities in the West. Audio teleconferencing is used by 17 percent for on-campus instruction and 10 percent for off-campus instruction.

Regular telephone service is used by 15 percent for on-campus instruction and by 12 percent for off-campus instruction. In addition, electronic blackboard and facsimile are each used by 3 percent of the institutions and audiographics are used by 2 percent. Public FM radio is used by 11 percent of the responding institutions for on-campus instruction and by 7 percent for off-campus instruction.

Table 5

Audio Technologies Used

	On Campus	Off Campus	Both On and Off*
None -- 18%			
AM radio	3%	2%	1%
FM radio, public	11	7	5
FM radio, commercial	3	1	1
SCA radio	0	0	0
Cable radio	1	0	0
Audio cassette	66	29	26
Audio teleconferencing	17	10	8
Regular telephone service	15	12	8
Audiographics	2	1	1
Facsimile	3	1	1
Radio talkback	0	1	0
Electronic blackboard	3	2	1
Other	3	2	1

*The figures for "both on and off" campus are included in the figures for "on campus" and "off campus."

3. Computer Applications (Tables 6, 7)

Eighty-nine percent of the responding institutions report they are using computers for instruction. Nearly three-quarters (71 percent) of the institutions in the 13 western states are using computer-assisted instruction (CAI) on campus. The number is much smaller (12 percent) for off-campus instruction.

The expanding role of computers in education is evident in the consistently high percentages for on-campus use associated with almost all the computer applications listed. For example, 43 percent report using on-line bibliographic searches, one-third use computer-managed instruction, 39 percent of the institutions use computers for simulation and gaming, and approximately one-third of the institutions use electronic mail and computer-assisted design.

One indication of the extent to which microcomputers have penetrated higher education can be found in Table 7; only 10 percent of the responding institutions do not use microcomputers for instruction and 47 percent claim to be networking microcomputers.

Table 6

Computer Applications Used

	On Campus	Off Campus	Both On and Off*
None -- 11%			
Computer-assisted instruction	71%	12%	11%
Computer-managed instruction	33	6	6
Computer-based instructional management	15	3	2
Computer-assisted design	32	2	1
Computer-based training	25	5	4
Computer conferencing	6	6	2
Electronic mail	27	10	7
Simulation/gaming	39	6	5
Modeling	27	4	3
On-line bibliographic searches	43	8	6
Other	3	0	0

*The figures for "both on and off" campus are inclued in the figures for "on campus" and "off campus."

Table 7

Computer Hardware Used to Deliver Instruction to Students
(other than computer science students)

	Degree of Use				
	None	Low	Medium	High	N=
Mainframe computers	43%	17%	22%	18%	243
Minicomputers	30	23	26	21	261
Microcomputers (stand-alone)	10	32	34	24	304
Microcomputers (network)	54	22	15	10	207
Time-sharing terminals	34	20	26	21	221

4. Combinations of Technologies (Table 8)

The survey results indicate that many institutions in the region are combining two or more technologies in order to serve student instructional needs. These data suggest that educators are breaking out of traditional patterns of reliance on single technologies and are selecting appropriate combinations from the menu of available technologies.

In many cases we find educators combining an interactive technology with a noninteractive technology in order to get the desired mix of resources. Some examples of this pattern include computer and videotape (17 percent), broadcast (or one-way cable) television and audio teleconferencing (11 percent), audio teleconferencing and videotape (8 percent), audio teleconferencing and slides or overheads (8 percent), and audiotape and telephone (6 percent).

A notable exception to this pattern is the combination of two interactive technologies, computer and telephone (14 percent). Another exception is the combination of two noninteractive technologies, broadcast (or one-way cable) television and audiotape (10 percent).

5. Technology Use Patterns (Table 9)

An examination of the use of various technologies by size and type of institution reveals some consistent patterns. Generally, a larger proportion of the institutions with high enrollments make instructional use of information technologies although the pattern varies from one technology to another. Two-year colleges in the region are very heavy users of information technologies. Of the selected technology examples included in Table 9, two-year colleges make the greatest use of all technologies except simulation and gaming. The baccalaureate institutions, which are smaller and generally private, make less use of technology overall; in all of the categories in Table 9, except simulation and gaming, they account for the smallest percentage of users. Graduate and professional universities make nearly as extensive use of information technologies as the two-year colleges. The graduate and professional institutions tend to make greater use of computer applications which often require larger capacity hardware (e.g., simulation and gaming).

Table 8

Combinations of Technologies Used

Broadcast or cable TV/audio teleconferencing	11%
Broadcast or cable TV/audiotape	10
Broadcast or cable TV/radio	5
Audio teleconferencing/videotape	8
Audio teleconferencing/slides, overheads	8
Audio teleconferencing/slow-scan TV	2
Audio teleconferencing/facsimile	2
Audio teleconferencing/videotext	0
Audio teleconferencing/electronic mail	2
Radio/telephone	4
Audiotape/telephone	6
Computer/videotape	17
Computer/videodisc	4
Computer/cable TV	6
Computer/broadcast TV	4
Computer/audiotape	4
Computer/telephone	14
Computer/facsimile	2
Other	1

Table 9

Technology Use Patterns by Type and Size of Institution (selected examples only)

	Public Television	Video Cassette	Audio Cassette	Audio Telecon.	CAI	Simulation & Gaming
Entire Population	38%	86%	69%	19%	72%	40%
Type						
Two-Year	52	91	72	21	81	28
Baccalaureate	25	77	64	9	55	34
Graduate/Prof.	26	85	66	20	67	53
Enrollment Size						
Under 506	9	77	57	9	29	19
506-1,600	20	83	57	10	68	39
1,601-3,667	45	91	75	19	87	46
3,668-9,610	51	94	78	28	85	47
9,611 plus	63	88	75	29	91	47

C. Collaborations: To What Extent Do Institutions Participate in Networks and Consortia?

1. Working Relationships with Public Broadcasters (Table 10)

One of the purposes of the survey was to determine the extent to which colleges and universities collaborate with other organizations to make more effective use of information technologies. Relationships between higher education institutions and public broadcast agencies are of particular interest to the staff of the Pacific Mountain Network (PMN).

The survey reveals that 37 percent (n=324) of the institutions do have formal or informal working relationships with public television agencies and 21 percent (n=317) have such relationships with public radio agencies. If we include the colleges that are public broadcast licensees with those that indicate they have formal working relationships with public broadcast agencies, there are roughly as many formal as informal relationships; this is true with both television and radio agencies.

2. Participation in Networks and Consortia (Table 11)

In response to a question about institutional participation in any information technology networks or consortia, 47 percent (n=313) responded affirmatively and 53 percent responded negatively. Table 11 refers to another question which asked respondents to name any formal or informal collaborative efforts in which their institution participates with other institutions or organizations to deliver instruction via information technology; 38 percent listed one or more cooperative activity.

The responses to these items indicate a modest level of collaborative activity in the region. As the data in Table 11 indicate, video telecourse consortia and computer networks are the most common types of collaborative organizations in which colleges in the region participate. Most of this activity is at the state level but many colleges and universities also report participation in local and national collaborations.

Table 10

Working Relationships with Broadcasters

	Public TV (n = 324)	Public Radio (n = 317)
No relationship	64%	80%
Informal	17	10
Formal	14	2
College/licensee	6	9

Table 11

Types of Networks and Consortia in which Institutions Participate*

	Local	State	National	Two or More Levels
Broadcast video network	4%	6%	2%	3%
Radio network	1	1	5	0
Non-broadcast video network	1	3	1	1
Audio teleconferencing network	1	2	2	1
Computer network	4	8	8	4
Cable TV consortium	7	1	0	1
Video telecourse consortium	8	11	3	3
Video teleconferencing consortium	1	2	3	0

*The actual percentages may be somewhat higher than the figures in this table because institutions that participate in collaborative efforts at two or more levels were coded separately. The variation could be as little as one (e.g., audio teleconferencing network) or as high as four (e.g., computer network).

D. Instruction: For What Instructional Purposes Are Educators Using Information Technologies?

1. Curriculum

a. Instructional Purposes (Table 12)

The survey asked respondents to indicate for which instructional purposes their institutions use video, audio, and computer technologies. In order to respond to this question they had to aggregate the three types of technologies, rather than provide a separate response for each. This means that the data we obtained give us an indication of how much these combined technologies are used for each of the listed educational purposes (e.g., graduate education).

When asked to what extent information technologies are used to deliver instruction at the lower division undergraduate level, 63 percent (n=306) report making medium or high use. The figure for upper division undergraduate instruction is 45 percent (n=198), for vocational/technical it is 43 percent (n=220), and for graduate education the figure is 34 percent (n=194). Table 12 summarizes the results of this question.

b. Curriculum Areas (Table 13)

We asked to what extent institutions are using information technologies for instructional purposes in various academic content areas. Unlike the previous question, in this case we asked for separate responses for video, audio, and computer technologies and whether institutions make either no, low, medium, or high use of each technology.

The trends revealed by the data are consistent with what most individuals familiar with higher education would probably predict--more use of computers in the sciences, more use of video and audio in the social sciences and humanities. Nevertheless, the usage percentages are interesting.

In the social sciences, 58 percent of the respondents indicate their institution uses video technologies; the response for audio technologies is 32 percent, and for computer technologies it is 23 percent. For the humanities the video, audio, and computer percentages are 49, 41, and 15, respectively. For the physical and biological sciences they are 53, 20, and 52 percent.

Among the professionally-oriented curriculum areas business is by far the heaviest overall user of information technologies; the percentages are 50 for video, 21 for audio, and 66 for computer. The percentages for engineering are, respectively, 27, 7, and 47. For medicine they are 23, 11, and 9, and for law they are the lowest of all categories--6, 3, and 6.

Table 12

Degree of Use of Video, Audio and Computer Technologies for Various Instructional Purposes

	Medium or High Use	N=*
Lower division undergraduate	63%	306
Upper division undergraduate	45	198
Vocational/technical	43	220
Graduate education	34	194
Professional continuing education	28	209
Adult continuing education	25	220
Adult basic education	17	185
Public service programming	19	173
Educational/career information	28	215
Counseling	20	191
Assessment	16	172

*N = number of institutions responding to one of the item's alternatives: none, low, medium or high.

Table 13

Information Technology Use by Curriculum Areas

% = percentage of institutions making medium or high use of the technology
N = number of responses on the item

	Video		Audio		Computer	
	%	N	%	N	%	N
Social studies	58	275	32	248	23	258
Humanities	49	270	41	262	15	255
Physical and biological sciences	53	260	20	231	52	259
Computer science	54	244	11	208	87	284
Math	28	238	10	211	60	263
Business	50	248	21	219	66	262
Engineering	27	201	7	181	47	207
Medicine	23	167	11	163	9	162
Law	6	153	3	151	6	151

2. Learners

a. Special Learner Populations (Table 14)

One of the advantages of using information technologies for instruction is that they can help educators reach special populations and provide instruction tailored to their needs. The respondents were asked whether their institution uses information technologies to deliver specially-targeted instruction, either on campus or off campus, to any of the special populations listed.

White-collar professionals are the single largest category served via information technologies--23 percent on campus and 26 percent off campus. On campus, the other groups served by a relatively large number of institutions are blue/pink-collar workers, women, older adults, handicapped, and American Indians. The data on special populations served off campus are very similar and indicate a strong outreach commitment among many colleges in the region. While only 6 percent of the institutions indicate they are serving rural students on campus, 13 percent say they are using technology to reach them off campus. These data are summarized in Table 14.

b. Rural and Urban Communities (Table 15)

In answer to a question about the types of communities their institution serves via information technologies, respondents indicate approximately 28 percent are serving non-farm, rural communities and 26 percent serve farm communities.

Table 14

Special Populations Served with Targeted Instruction Via Technology

	On Campus	Off Campus	Both*
Professional -- white collar	23%	26%	12%
Workers -- blue/pink collar	13	14	6
Handicapped or homebound	15	11	4
Older adults (age 55+)	13	12	6
Rural adults	6	13	4
High school dropouts	9	6	3
Incarcerated	3	7	1
Women	14	11	7
Blacks	10	6	4
Hispanics	10	6	4
American Indians	11	8	5
Eskimo	4	3	1
Asian-American	10	6	4
Other	3	3	2

*The figures for "both on and off" are included in the figures for "on campus" and "off campus."

Table 15

Urban and Rural Communities Served Via Information Technologies

Central city	21%
Suburbs (close in)	30
Suburbs (distant)	17
Metropolitan area	25
Small city	29
Rural (non-farm)	28
Rural (farm)	26
Don't know	3
Other	4

c. Student Use (Tables 16, 17)

The survey asked what percentage of students use either video, audio, or computer technologies for instruction. Computers are being used by institutions to serve larger proportions of the student body than are either video or audio technologies. This pattern is most obvious when we combine the response alternatives (listed in Table 16) into two groups: 1-20 percent and 21-100 percent of the student population. In the 1-20 percent category, computers are used by only 38 percent of the institutions and, in the 21-100 percent category, computers are used by 58 percent of the institutions. The corresponding figures for video technologies are 50 and 48, respectively. For audio technologies tne figures are 58 and 32, respectively. This pattern is graphically portrayed in Figure 1 where the three technologies are represented as curves.

Respondents were also asked how many students at their institutions are enrolled in video or audio telecourses each year. Forty-five percent (n=284) of the institutions report that they do not use video telecourses and 64 percent (n=238) do not use audio telecourses. In view of the relatively low response rates on these two items, the percentage of non-users may be even higher.

As shown in Table 17, 29 percent of the responding institutions enroll between 1 and 100 students per year in video telecourses; 44 percent enroll between 1 and 500 students per year. Of those that responded to the audio telecourse question, 23 percent enroll between 1 and 100 students and 32 percent enroll between 1 and 500 students per year.

Table 16

Percentage of Students Using Information Technologies in Their Instructional Programs

	Percentage of Students Using Information Technologies							
	0	1-10	11-20	21-40	41-60	61-80	81-100	N=
Video	4%	28%	22%	19%	13%	12%	4%	277
Audio	10	34	24	16	7	7	2	251
Computer	6	18	20	27	19	9	3	271

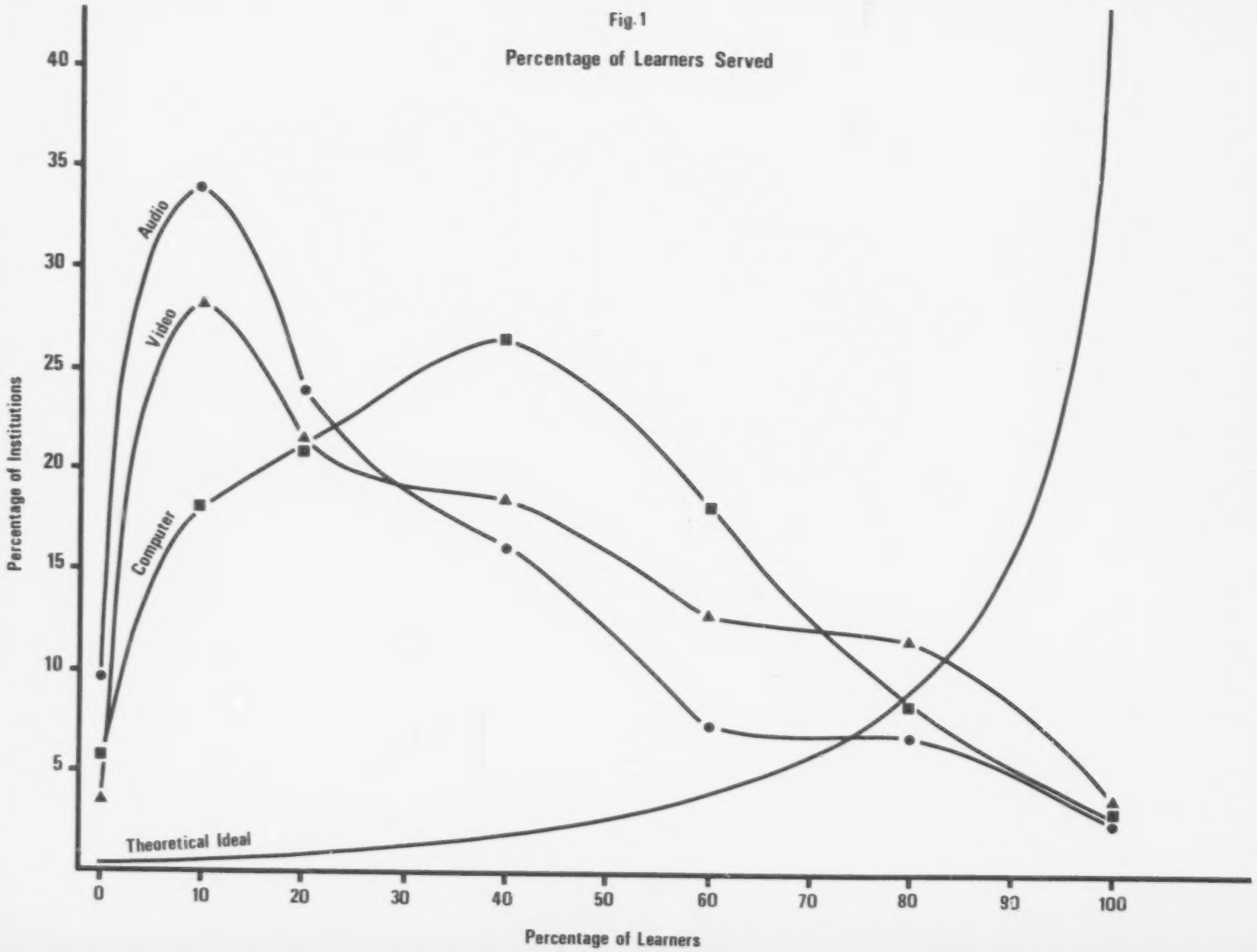
Percentages may not add to 100 due to rounding.

Table 17

Number of Students Enrolled in Video and Audio Telecourses Per Year

	Number of Enrollments									
	0	1-50	51-100	101-250	251-500	501-1000	1001-2000	2001-5000	Over 5000	N=
Video	45%	18%	11%	7%	8%	7%	2%	2%	1%	284
Audio	64	17	6	5	4	1	0	1	0	238

Fig. 1


Percentage of Learners Served
Percentage of Institutions
40
35
30
25
20
15
10
5
Audio
Video
Computer
Theoretical Ideal
0
10
20
30
40
50
60
70
80
90
100
Percentage of Learners

3. Faculty Incentives and Rewards for Using Information Technologies (Table 18)

We asked whether institutions offer special incentives or rewards to encourage faculty to get involved in the use of information technologies. They indicate that 33 percent do and 67 percent do not (n=319).

If you consider orientation and training in the use of information technologies to be an incentive for faculty, it is hard to resolve differences in the responses described above and the responses to a separate question on orientation and training. Only 16 percent indicate that some of their faculty do not receive special orientation and training. It may be that when respondents answered the first question they were thinking more in terms of incentives and rewards that involve money, promotion, or tenure. As the data in Table 18 illustrate, 62 percent (n=309) of the institutions offer orientation and training for up to one-quarter of their faculty (the combination of 20, 23, and 19 percent).

4. Courseware Production (Table 19)

The data indicate that few institutions in the region produce video, audio, or computer courseware for lease or purchase by other institutions; 17 percent (n=299) produce video telecourses, 7 percent (n=285) produce audio telecourses, and 21 percent (n=291) produce computer software. In a respondent population of 344 institutions, this translates to 52, 20, and 62 colleges or universities, respectively. The highest level of courseware production activity in the region is going on at two-year public colleges and graduate and professional (both public and private) institutions. Little courseware production is reported by the baccalaureate institutions.

5. Technology Task Forces or Study Groups

Two-thirds of the responding institutions (67 percent, n=331) report that their institution has created a task force or study group to assess institutional policies and plans regarding information technologies. This is a clear indication of the impact information technologies are having on many colleges and universities in the region.

Table 18

Percentage of Faculty Receiving Special Orientation or Training

Percentage of Faculty							
0	1-5	5-10	11-25	26-50	51-75	76-100	N=
16%	20%	23%	19%	12%	6%	5%	309

Table 19

Producers of Courseware for Lease or Purchase by Other Institutions

	Video Telecourses	Audio Telecourses	Computer Software
Do produce courseware	52 (17%)	20 (7%)	62 (21%)
Do not produce courseware	247 (83%)	265 (93%)	229 (79%)
Number of respondents	299	285	291
Two-year public	27	12	28
Two-year private	1	1	2
Baccalaureate public	1	0	0
Baccalaureate private	4	1	5
Graduate/prof. public	13	2	17
Graduate/prof. private	6	4	10

E. Policy Issues

1. Obstacles to Effective Use of Information Technologies

a. All Surveyed Institutions (Table 20)

In addition to describing how information technologies are being used by educators, the survey explored policy issues that influence how effectively these technologies can be used for instruction. In order to do this, the survey included questions about obstacles to more effective use as well as questions about potential actions that, if taken, might improve current practice.

When we asked respondents about a specific obstacle or hindrance to effective use of information technologies, they could indicate it was no obstacle, a minor obstacle, or a major obstacle. They could also indicate they did not know if it was an obstacle. For purposes of analysis the "minor" and "major" obstacle categories have been combined and the list of obstacles rank-ordered. Table 20 describes the obstacles along with their respective percentages and rankings.

The respondents left no doubt about which of the alternatives was the greatest obstacle to the effective instructional use of information technologies. Ninety-five percent indicate that "inadequate financial resources to obtain necessary hardware and software" is the greatest obstacle; 75 percent rate it as a major obstacle and 20 percent as a minor obstacle.

Lack of funds is a general problem in higher education but, as the intensity of these responses indicate, it is particularly crucial in the technology area where hardware and software costs are often so high that they may require major up-front investments. The importance of this issue is underscored in the state higher education executive officer (SHEEO) survey. One hundred percent, or all 13 SHEEO respondents agree that lack of funds is an obstacle to more effective use of information technologies by colleges. Eleven of the 13 SHEEO offices agree that it is a major obstacle while two believe it is a minor obstacle.

The second-ranked obstacle also deals with an issue that is very critical to the effectiveness of educational institutions. This issue is important because it is so intimately tied to the promotion and tenure system. Eighty-three percent (n=318) of the respondents indicate that the failure of the incentive and reward system to encourage faculty to spend the kind of time and effort required to make effective use of technology is seen as a minor or major obstacle.

The obstacles ranked third (82 percent, n=313) and fifth (74 percent, n=301) deal with the lack of courseware that meets institutional needs and the need for evaluative information to help educators select such courseware. Respondents rank the problem of providing logistical support for students using information technologies fourth (75 percent, n=295) among the 14 alternatives.

Judging from the respondents' rankings, faculty resistance to audio and video technologies is more of a hindrance than resistance to computers; they rank these items sixth and eighth, respectively. Seventy-two percent (n=317) of the respondents indicate faculty resistance to audio and video is an obstacle,

Table 20

Obstacles to More Effective Use of Information Technologies

% = percentage indicating item as minor or major obstacle;
n's range from 251 to 333
R = ranking of the obstacle among 14 alternatives

%	R	Obstacle
95	1	Inadequate financial resources to obtain necessary software and hardware
83	2	Inadequate rewards and incentives to encourage faculty to get involved with the technologies
82	3	Lack of courseware available that meets the institution's academic needs and standards
75	4	Logistical complexities involved in supporting students learning off campus via technology
74	5	Lack of reliable evaluation information about available media courseware
72	6	Faculty who are unsympathetic to the use of video and audio technologies
71	7	Inadequate information about current educational applications by other colleges and universities
65	8	Faculty who are unsympathetic to the use of computer technology
63	9	Inadequate advice and support from state policy makers
62	10	Inadequate knowledge about information technology on the part of state policy makers
41	11	Administrators who are unsympathetic to the use of information technologies
36	12	Unwillingness of educational institutions to cooperate with one another to use the technology
34	13	Inadequate cooperation from public broadcasting agencies
33	14	Inadequate cooperation from cable television companies

compared with 65 percent (n=313) who report resistance to computers as an obstacle. These data are consistent with recent patterns of institutional microcomputer acquisitions and computer literacy programs.

Respondents are not uncritical of actors outside the education community who influence institutional use of information technologies, such as policy makers, public broadcasters, and cable operators. However, they do not seem to view them as the primary obstacles to more effective use of information technologies. The highest-ranked obstacles refer to issues that are central to the institutions themselves: funding, rewards and incentives, courseware, student support logistics, and faculty attitudes.

Within the education community, other institutions and college administrators come in for the least criticism. Because most of the individuals who responded to the survey were administrators, the results on this item may have been different if all the respondents had been faculty members.

In another part of the survey we gave respondents the opportunity to step outside the constraints of forced-choice questions. A description of their responses to an open-ended question about problems encountered in using information technologies is included in the last part of Section II, Observations.

b. All Institutions--Based on Their Level of Technology Use

In addition to analyzing how the total surveyed population responded to the policy issues, we decided to see whether responses differed depending on the extent to which institutions use information technologies. We wanted to know if institutions respond differently to policy questions (e.g., the obstacles question discussed above) depending on whether they make heavy, moderate, or little use of computer technologies.

This analysis is puzzling. Among the low, medium, and high users, the middle group consistently expressed "major" concerns at a greater frequency than the low or high groups. For lack of an adequate explanation of this pattern, we did not pursue this analysis further. As explained in the methodology section, other measures of analysis (e.g., telecourse users and non-users) did produce clear differences.

c. All Institutions--Special Video Applications (Table 21)

One of the purposes of this survey was to gather information to assist educators and public broadcasters in their efforts to cooperatively deliver video and audio instruction. Staff from the Pacific Mountain Network (PMN) have been involved in this project from its inception. PMN has a particular interest in learning more about the needs of institutions that use telecourses and/or have working relationships with public broadcasters. In the analysis which follows in this and three subsequent sections, the focus will be on video telecourses and relationships with public broadcast television agencies. The number of institutions involved in audio telecourses and with public broadcast radio agencies is too small to justify including analyses of that data in this report.

Before examining the responses to the questions about obstacles, it is worth describing a general pattern that appears in the data. With few exceptions, the percentage of institutions that indicate items are minor or major obstacles is higher among video telecourse users than among non-users. The same pattern is evident among institutions that have working relationships with broadcasters versus those that do not have such relationships.

On six items this analysis indicates there are statistically significant differences between institutions that have working relationships (either informal or formal) with public broadcast television agencies and those that do not. A larger percentage of those with working relationships with public broadcasters indicates the following items are obstacles: inadequate rewards and incentives for faculty; faculty unsympathetic to audio and video technologies; inadequate advice and support from state policy makers; inadequate knowledge about information technology by state policy makers; faculty unsympathetic to computer technologies; and lack of cooperation from public broadcasters.

There is also a statistically significant difference between video telecourse users and non-users on four of the same items except faculty unsympathetic to computers, and inadequate rewards and incentives for faculty. In addition, a larger percentage of users indicates the following items are obstacles: inadequate financial resources and logistical complexities of off-campus support for students.

Table 21

Obstacles to More Effective Use of Information Technologies

Ratings by video telecourse non-users and users and by institutions without and with relationships (informal or formal) with public broadcast television agencies

% = percent indicating obstacle as minor or major*
R = ranking given by group to each item in a list of 14 alternatives

Population Ranking	Obstacle	Video Telecourse				Rel. With Broadcasters			
		Non-user		User		Without		With	
		%	R	%	R	%	R	%	R
1	Inadequate financial resources	93	1	98	1	--	--	--	--
2	Inadequate rewards and incentives for faculty	--	--	--	--	80	2.5	89	2
4	Logistical complexities of off-campus support for students	66	6	79	4.5	--	--	--	--
6	Faculty unsympathetic to audio/video technologies	65	7	79	4.5	64	7	86	3.5
8	Faculty unsympathetic to computer technology	--	--	--	--	60	8	72	9
9	Inadequate advice and support from state policy makers	54	9.5	69	7	48	10	80	5
10	Inadequate knowledge of information technology by state policy makers	54	9.5	67	9	49	9	78	7
13	Lack of cooperation from public broadcasters	27	14	41	12	25	14	43	12

*Only items on which the difference between the two groups (non-user and user, or without and with) is statistically significant are included in this table.

2. Potential Actions State Policy Makers Might Take to Facilitate Effective Use of Information Technologies

a. All Surveyed Institutions (Table 22)

When we asked respondents what actions state policy makers might take to facilitate more effective use of information technologies, we found their highest priority is very consistent with their response to the previously described question about obstacles. Eighty-nine percent (n=316) indicate additional financial support for the acquisition of hardware and courseware is either important or very important.

They also indicate they would like state policy makers to develop policies which encourage collaborative use of information technologies by numerous institutions (81 percent, n=304). They are equally concerned about the need for incentive programs to encourage greater faculty involvement in the use of information technologies (81 percent, n=310).

The other two alternatives presented to the respondents deal with funding formulas and with advocacy for the interests of colleges with broadcasters, cable operators, and vendors. Even though these are ranked lower than the others, they are still seen as important or very important by three-quarters of the respondents.

b. All Institutions--Special Video Applications (Table 23)

The pattern that emerged from the data in Table 21 is also apparent here. We find that respondents from colleges that use video telecourses and institutions that work with public broadcasters feel more strongly about the items in the policy questions than respondents from institutions that do not fall into these categories. In the case of the questions about potential actions state policy makers might take to facilitate more effective use of information technologies, the difference between the two sets of groups is statistically significant on all five items.

In each case a larger percentage of the institutions which are telecourse users and work with public broadcasters rate the items as more important than do non-users or those that do not work with public broadcasters. It is not so surprising that educators from institutions that use video should favor actions by state policy makers to enhance these activities. What is somewhat surprising is the extent of the difference between groups on all items.

Table 22

Importance of Actions State Policy Makers Might Take to Improve Use

% = percentage indicating action important or very important; n's range from 285 to 316
R = ranking given each action in a list of five alternatives

%	R	Action
89	1	Additional financial support for acquisition of hardware and courseware
81	2.5	Policies which encourage collaborative use of information technologies by numerous institutions
81	2.5	Incentive programs to encourage greater faculty involvement in information technology
76	4	Advocacy for the interests of institutions in their dealings with broadcasters, cable companies, vendors
75	5	Improvements in funding formulas for enrollment in courses using information technologies

Table 23

Potential Actions State Policy Makers Might Take to Facilitate More Effective Use of Information Technologies

Rated by non-users and users of video telecourses and by institutions without and with relationships (formal and informal) with broadcast television agencies.

% = percentage indicating action as important or very important*
R = ranking given by group to each item in a list of five alternatives

Population Ranking	Action	Video Telecourse				Rel. with Broadcasters			
		Non-user		User		Without		With	
		%	R	%	R	%	R	%	R
1	Additional financial support for software and hardware	81	1	96	1	82	1	98	1
2	Encourage collaborative use of technologies by institutions	71	3.5	90	2	76	2	87	4.5
3	Incentives for faculty involvement	72	2	88	3	71	3	94	2
4	Advocacy for colleges' interests in dealings with broadcasters, cable companies, vendors	71	3.5	82	5	68	4	87	4.5
5	Improve funding formulas for courses delivered via technologies	60	5	86	4	63	5	92	3

*The difference between the two groups (non-user and user, or without and with) is statistically significant for all items in this table.

3. Potential Actions Public Broadcasters Might Take to Facilitate More Effective Use of Information Technologies

a. All Surveyed Institutions (Table 24)

When we asked respondents about potential actions that public broadcast agencies might take to improve the use of information technologies, 78 percent (n=273) indicate they want broadcasters to provide additional means of distributing courseware (e.g., video cassette, satellite, videodisc). They may be expressing a preference for modes of delivery that are more convenient than broadcast, since items concerning the costs and availability of broadcast airtime are cited as important or very important potential actions by fewer institutions--66 percent (n=272) for reducing the costs of and 60 percent (n=271) for increasing the availability of airtime, respectively.

The respondents express equal concern over another action that public broadcasters might take. When asked about the possibility of public broadcasters developing telecourse production projects in collaboration with colleges and universities, again 78 percent (n=277) indicate such actions are important to them.

Judging from the data, the survey respondents do not seem to be too unhappy with public broadcasters. If many were highly dissatisfied with public broadcasters, the item about giving educators more input in course selection probably would have been ranked higher than sixth. However, we should not overlook the fact that 66 percent (n=272) indicate they would like the costs of airtime reduced, and 63 percent (n=267) want more input in the course selection process. So, with the exception of the items ranked fifth and sixth, the responses to this question suggest that the majority of institutions want more of the services public broadcasters have to offer.

b. All Institutions--Special Video Applications (Table 25)

In this section we focus on those institutions that are of most direct interest to public broadcast agencies--institutions which use video telecourses and work with broadcasters. The data reveal that public broadcasters and their services are also important to these educators. This is apparent from the consistently stronger responses from the telecourse/broadcast user group than those from institutions that are not involved with telecourses or public broadcasters. In all cases but one, the differences between groups are statistically significant.

On Table 25, the first two items were ranked highest by all groups, although the differences in percentages between non-users and users, and between those that have and do not have working relationships with public broadcasters are statistically significant. The responses to these questions leave little doubt that public broadcasters need to fully explore additional ways to deliver technology-based instruction and to become involved in collaborative production projects: 85 to 87 percent of the video users and those with working relationships with broadcasters agree on these needs.

Table 24

Importance of Actions Public Broadcasters Might Take to Improve Use

% = percentage indicating action is important or very important;
n's range from 267 to 283
R = ranking given each item in a list of seven alternatives

%	R	Action
78	1.5	Provide additional means of distributing courseware (e.g., video cassette, satellite, videodisc)
78	1.5	Develop telecourse production projects in collaboration with colleges and universities
74	3	Increase incentives for collaboration among colleges and universities (e.g., group buys of telecourses)
69	4	Increase the selection of courses from which educators could choose
66	5	Reduce the costs for educational use of airtime
63	6	Allow educators greater input in course selection
60	7	Allocate more broadcast time for higher education programming

Table 25

Potential Actions Public Broadcast Agencies Might Take to Facilitate Effective Use of Information Technologies

Rated by non-users and users of video telecourses and by institutions without and with relationships (formal or informal) with broadcast television agencies.

% = percentage indicating action important or very important*
R = ranking given by group to each item in a list of seven alternatives

Population Ranking	Action	Video Telecourse				Rel. with Broadcasters			
		Non-user		User		Without		With	
		%	R	%	R	%	R	%	R
1.5	Provide additional means of distributing courseware (e.g., tape, videodisc, satellite)	74	1	85	2	73	1	85	1.5
1.5	Collaborate with colleges in developing telecourse production projects	68	2	87	1	72	2	85	1.5
3	Increase incentives for collaboration among colleges and universities	67	3	82	3	70	3	78	4
4	Increase selection of educational courses	57	4	81	4	61	4	79	3
5	Reduce cost of airtime for education	54	5	75	5	58	5	74	5
6	Give educators greater input in course selection	53	6	71	7	52	6.5	73	6
7	Allocate more broadcast time for higher education	43	7	72	6	52	6.5	68	7

*The difference between the two groups (non-user and user, or without and with) is statistically significant for all items, with one exception--the difference between the without and with groups on the third item.

4. Areas for Potential Collaboration

a. All Surveyed Institutions (Table 26)

When we asked about the importance of certain types of collaborative activities we received a very high percentage of positive responses. For the entire population, the percentages of institutions indicating these potential collaborative areas as important range from 75 to 97 percent. Since the respondents were not being asked to commit their institution to participating in any of the proposed collaborative activities, it is not surprising that they felt free to agree to the importance of the items.

Three of the four highest ranked items deal with information sharing and networking among educational colleagues. Respondents indicate that there is much to be gained by merely communicating with others who are dealing with similar problems and issues. This study serves as an excellent tool for identifying institutions that are addressing similar problems and could benefit by being linked with one another.

As we observed in our analysis of two other policy questions, the respondents feel very strongly about the need to encourage faculty to get involved in the use of information technologies. Here again they indicate the importance of orientation and training for faculty by ranking it third among nine alternatives.

The items ranked fifth through eighth are considered important or very important by over 79 percent of the respondents. They all deal with the need for educators to work together in acquiring, developing, previewing, evaluating, and sharing courseware.

It is difficult to determine from the survey responses how important it would be to educators in the 13 western states for state educational policy makers to receive orientation and training about instructional applications of information technologies. While it is true that this item is ranked last, it is also true that 75 percent (n=280) of the respondents indicate such an activity would be important.

b. All Institutions--Special Video Applications (Table 27)

The differences between institutions with and without working relationships with public broadcasters turn out to be statistically significant on four of the nine items in the question about potential collaborative activities. Three of the items focus on joint efforts to share information about technology applications, to preview and evaluate courseware, and to acquire courseware. The fourth focuses on collaborative efforts to provide orientation and training for state policy makers. In each case a larger percentage of the respondents from institutions that work with public broadcasters indicate the potential collaborative action is important.

With one exception, the pattern is exactly the same for users and nonusers of video telecourses. The differences between these two groups are not statistically significant on the item dealing with shared preview and evaluation of courseware.

Table 26

Importance to Institutions of Potential Collaborative Activities

% = percentage indicating activities are important or very important; n's range from 280 to 324
R = ranking given each item in a list of nine alternatives

%	R	Action
97	1	Information sharing with educators who are using information technologies
93	2	Networking with colleagues regarding experiences in acquiring and using hardware and software
92	3	Orientation and training opportunities for faculty and staff
88	4	Networking with colleagues at other institutions regarding applications of technology to specific educational problems (e.g., serving remote learners)
87	5	Shared preview and evaluation of available courseware
85	6	Shared development of video, audio, or computer courseware
81	7	Shared use of existing locally-developed courseware
79	8	Shared lease or purchase of video, audio, or computer courseware
75	9	Orientation and training for state-level educational policy makers

Table 27

Collaborative Activities Institutions Might Participate in to Facilitate More Effective Use of Information Technologies

Ratings by non-users and users of video telecourses, and by institutions without and with relationships (formal or informal) with broadcast television agencies.

% = percentage indicating activity is important or very important*
R = ranking given by group to each item in a list of nine alternatives

Population Ranking	Activities	Video Telecourse				Rel. With Broadcasters			
		Non-user		User		Without		With	
		%	R	%	R	%	R	%	R
4	Networking with other institutions about using technology to solve specific problems	83	5	93	3	84	4	95	3
5	Shared preview and evaluation of available courseware	--	--	--	--	83	5	93	4.5
8	Shared lease or purchase of courseware	73	8	85	8	75	8	87	7.5
9	Orientation and training opportunities for state policy makers	59	9	86	7	64	9	87	7.5

*Only those activities where the difference between the two groups (non-user and user, or without and with) is statistically significant are shown.

V. The SHEEO Survey

A. SHEEO Survey

In addition to the survey of institutions in the region, WICHE and PMN also conducted a survey of the State Higher Education Executive Officers (SHEEO) in the 13 western states. The questions in the SHEEO survey deal with issues similar to those in the institutional survey and, in some cases, are exactly the same. The SHEEO survey focuses on the role of the state higher education authority and on policy issues related to information technology applications by colleges and universities.

B. The SHEEO Agency Role

1. Knowledge about Educational Applications of Information Technologies (Tables 28, 29)

SHEEO staff were asked to characterize the level of knowledge their agency has about the nature and extent of information technology use in institutions in their state. The responses reveal that SHEEO agency staff feel they know considerably more about administrative applications than they do about instructional applications of information technologies.

Forty-six percent of the SHEEO agencies indicate they have minimal knowledge about instructional applications of audio and computer technologies and 38 percent report having minimal knowledge about video applications. Fifty-three percent say their staff have a working or comprehensive knowledge about audio and computer instructional applications and 62 percent have a working or comprehensive knowledge of video applications.

They express more confidence about their knowledge of administrative applications. Ninety-two percent indicate they have a working or comprehensive knowledge about computer applications and 62 percent say their staff have a working or comprehensive knowledge of administrative applications of video and audio technologies.

Table 28

Level of Knowledge of SHEEO Agencies Regarding Instructional Applications of Information Technologies at Institutions

	No Knowledge	Minimal Knowledge	Working Knowledge	Comprehensive Knowledge
Audio	0%	46%	38%	15%
Video	0	38	31	31
Computer	0	46	38	15

Table 29

Level of Knowledge of SHEEO Agencies Regarding Administrative Applications of Information Technologies at Institutions

	No Knowledge	Minimal Knowledge	Working Knowledge	Comprehensive Knowledge
Audio	15%	23%	31%	31%
Video	15	23	31	31
Computer	0	8	46	46

2. Information Technology Task Forces (Table 30)

We asked how many had task forces in their state that are addressing policies or plans for development of information technologies. The number of SHEEOs indicating the existence of statewide task forces is greater than the number indicating the existence of local task forces within their state--14 local task forces were reported as compared to 32 statewide task forces.

3. Statewide Master Plan for Information Technologies

When asked whether their agency had a statewide higher education master plan for information technologies, three SHEEOs indicate they do have a master plan and ten report they do not yet nave such a plan.

4. Potential Services SHEEO Agencies Would Value (Table 31)

When asked about services an organization like WICHE might provide to SHEEO agencies, the respondents rank the six possible services in the order shown in Table 31. Assistance in the area of model policy development for states and institutions is of most interest to the SHEEO respondents. The establishment of networks among the state higher education authority in each state is the least important of the six alternatives. However, as noted below for Table 34, the development of networks to assist colleges and universities is considered among the most important collaborative activities.

Table 30

Number of SHEEO Agencies Reporting the Existence of Local or Statewide Information Technology Task Forces

Technology Emphasis	Local Task Forces	Statewide Task Forces
Audio	3	6
Video	4	9
Computer	4	8
Information Technologies in General	3	8
Other	0	1

Table 31

Potential Services Related to Information Technologies that SHEEO Agencies Would Most Value

Rank	Services
1	Develop model policy guidelines for states
2	Develop model policy guidelines for institutions
3	Develop model planning for institutions
4	Facilitate networking (e.g. putting people in touch with one another)
5	Periodically update and disseminate a survey of instructional uses
6	Establish networks

C. Policy Matters Affecting the Use of Information Technologies

1. Obstacles to Effective Use of Information Technologies (Table 32)

The SHEEO agencies were asked to react to a list of obstacles containing most of the same items that appear in the institutional survey questions on obstacles and hindrances. The SHEEO respondents agree with the college respondents that the greatest hindrance to more effective use of information technologies is inadequate financial resources to obtain necessary hardware and software. They rank inadequate information about current educational applications of information technologies and the lack of reliable evaluative information about courseware higher than the college respondents do.

The SHEEO agency respondents differ from the college respondents most in regard to the issue of interinstitutional cooperation. Eighty-five percent of the SHEEO respondents note the failure of colleges to collaborate with one another as an obstacle while only 36 percent of the college respondents consider it an obstacle.

2. Importance of Potential Actions State Policy Makers Might Take (Table 33)

Like the college respondents, SHEEO respondents rate additional financial support as a high priority but they indicate the most important action would be to implement policies which encourage collaborative use of information technologies by numerous institutions. Only 82 percent of the college respondents see this as an important action while 100 percent of the SHEEO respondents consider it important.

Table 32

Obstacles to More Effective Utilization of Information Technologies as Viewed from the SHEEO Perspective

% = percentage indicating the item is a minor or major obstacle
R = ranking given this item in a list of eleven alternatives

%	R	Obstacles
100	1	Inadequate financial resources to obtain necessary hardware and software
92	2.5	Inadequate information about current educational applications of information technologies by other colleges and universities
92	2.5	Lack of reliable evaluative information about available media courseware
85	4	Inabilities (because of tradition, lack of appropriate mechanisms, funding procedures, etc.) of educational institutions in the area to cooperate with one another to use the technology
77	6	Logistical complexities involved in supporting students learning off-campus via technology
77	6	Inadequate rewards and incentives to encourage faculty to get involved with the technologies
77	6	Inadequate advice and support from state policy makers
69	8.5	Inadequate knowledge about information technologies on the part of the state policy makers (e.g., legislators)
69	8.5	Administrators who are unsympathetic to the use of information technologies
46	10	Inadequate cooperation from public broadcasting agencies
15	11	Inadequate cooperation from cable television companies

Table 33

Importance of Potential Actions by State Policy Makers

% = percentage indicating the action would be important or very important
R = ranking given the item among six alternatives

%	R	Actions
100	1	Implement policies which encourage collaborative use of information technologies by numerous institutions
92	2	Budget additional financial support for acquisition of information technologies hardware and courseware
77	4.5	Implement modified funding formulas for enrollment in courses using information technologies (i.e., that acknowledge differences in student/faculty ratios, start-up costs, plant utilization, etc.)
77	4.5	Recommend modified faculty reward systems to encourage greater faculty involvement in information technologies
77	4.5	Recommend modified faculty workload policies and provisions that reflect unique problems of electronic courseware development
77	4.5	Coordinate advocacy for the interests of institutions in their dealings with broadcasters, cable companies, vendors

3. Importance of Potential Collaborative Activities (Table 34)

We asked SHEEO respondents how important it would be to them if organizations like WICHE and PMN would take certain actions to assist colleges in their efforts to cooperatively make more effective use of information technologies. They indicate that information sharing, networking, and faculty and staff orientation and training would be the most important. These are the same priorities expressed by the institutional respondents.

4. Information Needed by SHEEO Agencies

The survey asked SHEEO respondents about policy areas related to information technologies about which they need more information. The most commonly cited issue relates to the transfer of credit from one institution to another for instruction delivered via information technologies. Another frequently mentioned topic that SHEEO staff want to learn more about is the accreditation of programs delivered via technology. Other topics about which SHEEO staff indicate they need more information include the following:

- Devising cost accounting procedures for instruction delivered via information technology,
- Planning statewide delivery systems,
- Determining which institutions should acquire which technological capacities within a statewide delivery system,
- Devising budgeting models for statewide delivery systems,
- Controlling the quality of instruction delivered via technology,
- Financing hardware and software acquisitions,
- Devising copyright policies for software development, and
- Assessing the impact of information technologies on colleges, faculty.

5. Research and Analysis Areas that Need Urgent Attention

SHEEO staff are nearly unanimous in their call for research and analysis on learning outcomes. They are interested in comparing learning that takes place via technology with traditional classroom learning as well as distance learning versus on-campus learning. They are also interested in comparing the effectiveness of learning that takes place via alternative information technologies. Other topics of concern include the following:

- Persistence and completion rates for remote learners using information technologies,
- Cost-effectiveness of using alternative technologies to deliver instruction, and
- Successful ways of applying information technologies to the problems of rural education.

Table 34

Importance to SHEEOs of Potential Collaborative Activities in Which They Might Participate

% = percentage indicating the item is important or very important
R = ranking given each item among a list of nine alternatives

%	R	Actions
92	1	Information sharing with other educators who are using information technologies
85	2	Networking with other SHEEOs regarding applications of technology to specific educational problems (e.g., serving remote learners)
77	3	Networking with other SHEEOs regarding experiences in acquiring and using hardware and courseware
69	4	Cooperating with other SHEEOs and higher education institutions in orientation and training opportunities for faculty and staff
62	6.5	Cooperating with other SHEEOs in orientation and training of other state-level educators and policy makers
62	6.5	Cooperating with other SHEEOs in promoting shared development of video, audio, or computer courseware
62	6.5	Cooperating with other SHEEOs in encouraging shared preview and evaluation of available courseware
54	8.5	Cooperating with other SHEEOs in shared lease or purchase of video, audio, or computer courseware
54	8.5	Cooperating with other SHEEOs in providing for shared use of existing locally developed courseware

6. Mechanisms that Need to be Established to Encourage Collaborative Use of Information Technologies

SHEEO respondents suggest a number of mechanisms or incentives to encourage more cooperative use of information technologies at both the state and regional levels. At the state level, they stress the importance of linking collaborative efforts to the budget process in order to build in financial incentives for interinstitutional cooperation. They also emphasize the importance of involving campus level academic leadership in the collaborative effort. Some of the specific suggestions made by the SHEEO respondents include the following:

State Level

- Convene a statewide task force or committee of representatives from the universities, community colleges, governing board staff, and the legislature;
- Develop a consortium of public institutions, with a SHEEO staff member as coordinator, with authority to receive state financial support and provide funds to institutions as an incentive to collaboration;
- Authorize the state higher education agency to distribute funds to institutions for acquisition of hardware and software;

- Establish an interagency telecommunications cooperative, composed of CEO level representatives from higher education, public education, health, transportation, public safety, and other agencies, to coordinate the use of information technologies throughout the state (e.g., Utah);

- Develop statewide communications networks to cooperatively manage a statewide computer or microwave system;

- Coordinate interconnections among various technological resources (e.g., local cable systems) through a statewide body; and

- Develop a comprehensive state plan for information technologies.

Regional Level

- Establish a regional information exchange network;

- Form a regional cooperative to develop plans for interstate cooperation and information/resource sharing, such as the Northwest Task Force on Higher Education Information Technologies established by WICHE and PMN; and

- Coordinate regional acquisition and use of technology (e.g., satellite).

VI. State Summaries

Data from selected survey questions are presented on a state-by-state basis for each of the 13 states. Table 1 is a listing of institutions which submitted completed surveys to WICHE. In the six columns, a symbol indicates the institution's response/score on the following items:

- Columns 1-3, High Video, Audio, and Computer Use. Separate video, audio and computer composite scores were used to compile a listing of institutions in the 13 western states which fall into the top 20 percent with regard to video, audio, and computer use. An asterisk (*) indicates that the institution was among the top 20 percent in the region on this particular item.

  The "top 20" distinction is based on video, audio, and computer scores which combine all available information into a single comprehensive score. For example, to generate the video score, six intermediate scores were computed based on responses to the following survey questions:

  1. on-campus use of video technologies (items 2A2-20, on);
  2. off-campus use of video technologies (2A2-20, off);
  3. curriculum areas using video technologies (3B1-9);
  4. percentage of learners served by video (3E1);
  5. number of enrollments in video telecourses (3F1);
  6. production of video telecourses (3G1).

  The six intermediate scores were standardized for the population (n=344). The standardized scores were then summed and standardized to obtain a comprehensive video use score. Audio and computer use scores were computed in a similar manner.

  No score was computed for institutions which left blank or did not know (i.e., marked "?") items 3B, 3E,3F, or 3G. While institutions with scores high enough to appear in the top 20 percent in the region are clearly among the most active and experienced technology users, readers should not infer that other institutions, particularly those with missing data, are not active technology users.

- Column 4, Courseware Producer. Refers to question 3G of the survey and indicates that the institution produces audio, computer, or video courseware/software for lease or purchase by other institutions.

- Column 5, Faculty Incentives/Training. Refers to questions 3H and 3I, and indicates that the institution provides orientation or training to 50 percent or more of its faculty in the use of information technologies and/or offers special incentives or rewards to encourage faculty involvement in information technologies.

- Column 6, Task Force. Refers to question 3J, and indicates that the institution has created a task force to study institutional plans and/or policies with respect to information technologies.

Tables 2 through 5 reflect the percentages of institutions, for each state, responding to selected survey questions (see copy of the survey instrument in Appendix B):

> Table 2, "Instructional Use of Video, Audio, and Computer Technologies," refers to survey questions 2A, 2B, and 2C.
>
> Table 3, "Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies," refers to question 3C.
>
> Table 4, "Percentage of Students Using Information Technologies for Instruction," refers to question 3E.
>
> Table 5, "Curriculum Areas with High Utilization of Information Technologies," refers to question 3B.

The number of institutions responding to each question is reported for each table as (N=).

STATE SUMMARY

ALASKA

Table 1. Institutions Responding to Survey	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Alaska Bible College						
Alaska Pacific University	-	-	*			
Sheldon Jackson College		*				△
Tanana Valley Community College		-	-			
University of Alaska, Anchorage	*	*	*			△
University of Alaska, Juneau		*	*		△	△
University of Alaska, Kenai Peninsula Community College	*	*	*			△
University of Alaska, Ketchikan Community College						
University of Alaska, Kodiak Community College						
University of Alaska, Kuskokwim Community College		*			△	△
University of Alaska, Matanuska Susitna Community College	-					
University of Alaska, Islands Community College	*	*		a		△

Key to Symbols

- * among the top 20 percent in the West
- - no score computed because of missing data
- a audio courseware producer
- c computer software producer
- o "other" courseware producer
- v video courseware producer
- △ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=12)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 8%							
Broadcast TV, public	33%	50%	25%	Satellite-receive	33%	33%	25%
Broadcast TV, commercial	17	17	17	Satellite-send	0	8	0
Cable TV, one-way	16	8	8	Videotext	0	0	0
Cable TV, interactive	0	0	0	Teletext	8	8	8
Instructional Television Fixed Service (ITFS)	25	25	17	Video teleconferencing (one-way video)	0	8	0
Point-to-point microwave	16	8	8	Video teleconferencing (two-way video)	0	0	0
Slow-scan, freeze-frame TV	0	0	0	Low power TV	0	0	0
Video cassette	83	83	75	Direct broadcast TV	0	0	0
Videodisc	8	0	0	Slides, overheads	75	58	50
Closed circuit TV	8	0	0				

B. Percentage of Institutions Using Audio Technologies (N=12)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 8%							
AM radio	25%	8%	8%	Audio teleconferencing	67%	84%	67%
FM radio, public	16	16	8	Regular telephone service	33	42	25
FM radio, commercial	0	0	0	Audiographics	0	0	0
SCA radio	0	0	0	Facsimile	8	0	0
Cable radio	0	0	0	Radio talkback	0	0	0
Audio cassette	34	34	17	Electronic blackboard	0	0	0

C. Percentage of Institutions Using Computer Technologies (N=12)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 8%							
Computer-assisted instruction (CAI)	75%	58%	58%	Computer-based training (CBT)	42%	17%	17%
Computer-managed instruction (CMI)	50	25	25	Computer conferencing	50	41	33
Computer-based instructional management (CBIM)	34	17	17	Electronic mail	83	58	50
Computer-assisted design (CAD)	8	0	0	Simulation/gaming	42	17	17
				Modeling	17	0	0
				Online bibliographic searches	25	16	8

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=12)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	42%	42%	25%
Workers, blue/pink collar	8	16	8
Handicapped or homebound	8	17	0
Older adults (age 55 plus)	8	16	8
Rural adults	25	58	25
High school dropouts	25	34	17
Incarcerated	0	0	0
Women	8	16	8
Blacks	0	0	0
Hispanics	0	0	0
American Indians	16	33	8
Eskimo	16	16	8
Asian-Americans	8	8	8

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=10)	0%	60%	40%	0%
Audio (N=10)	0	60	40	0
Computer (N=11)	9	46	36	9

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	44%	9	33%	9	13%	8
Humanities	44	9	30	10	0	7
Physical and biological sciences	44	9	10	10	43	7
Computer science	56	9	10	10	75	8
Math	38	8	0	9	44	9
Business	44	9	9	11	38	8
Engineering	0	7	0	8	0	7
Medicine	29	7	25	8	0	7
Law	0	7	0	8	0	6

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

ARIZONA

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
American Graduate School of International Management					△	△
American Indian Bible College				a,c,v		
Arizona College of the Bible	-	-	-			△
Arizona State University	*				△	△
Arizona Western College						△
Cochise College	-	-	-		△	
College of Ganado	-	-				△
Devry Institute of Technology	-	-		c,v		△
Glendale Community College	-	-	-	c	△	△
Grand Canyon College	-	-				
Maricopa Technical Community College	-	-			△	
Mohave Community College	-	-	-			
Northern Arizona University			*	c	△	△
Northland Pioneer College	-	-	-		△	
Phoenix College		*	-			
Rio Salado College	*	*		a,v	△	△
Scottsdale Community College					△	△
South Mountain Community College					△	△
University of Arizona	-	-		a,c,v	△	△
Yavapai College	-	-	-		△	△

Key to Symbols

* among the top 20 percent in the West
\- no score computed because of missing data
a audio courseware producer
c computer software producer
o "other" courseware producer
v video courseware producer
△ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=20)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 10%							
Broadcast TV, public	15%	25%	5%	Satellite-receive	10%	5%	0%
Broadcast TV, commercial	10	5	0	Satellite-send	0	0	0
Cable TV, one-way	20	25	10	Videotext	0	0	0
Cable TV, interactive	0	0	0	Teletext	5	0	0
Instructional Television Fixed Service (ITFS)	5	10	5	Video teleconferencing (one-way video)	10	5	5
Point-to-point microwave	5	5	0	Video teleconferencing (two-way video)	5	0	0
Slow-scan, freeze-frame TV	0	10	0	Low power TV	0	0	0
Video cassette	70	20	20	Direct broadcast TV	0	0	0
Videodisc	0	0	0	Slides, overheads	70	20	20
Closed circuit TV	20	0	0				

B. Percentage of Institutions Using Audio Technologies (N=20)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 20%							
AM radio	5%	10%	5%	Audio teleconferencing	30%	15%	15%
FM radio, public	10	10	5	Regular telephone service	10	15	10
FM radio, commercial	5	0	0	Audiographics	10	5	5
SCA radio	0	5	0	Facsimile	0	0	0
Cable radio	0	0	0	Radio talkback	5	0	0
Audio cassette	45	25	20	Electronic blackboard	0	0	0

C. Percentage of Institutions Using Computer Technologies (N=20)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 10%							
Computer-assisted instruction (CAI)	75%	5%	5%	Computer-based training (CBT)	35%	5%	5%
Computer-managed instruction (CMI)	40	5	5	Computer conferencing	0	10	0
Computer-based instructional management (CBIM)	10	0	0	Electronic mail	40	5	5
Computer-assisted design (CAD)	40	0	0	Simulation/gaming	45	0	0
				Modeling	30	0	0
				Online bibliographic searches	35	0	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=20)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	10%	25%	5%
Workers, blue/pink collar	5	15	0
Handicapped or homebound	10	10	0
Older adults (age 55 plus)	5	15	0
Rural adults	10	20	5
High school dropouts	10	5	0
Incarcerated	5	5	0
Women	10	5	0
Blacks	10	5	0
Hispanics	10	5	0
American Indians	10	0	0
Eskimo	5	0	0
Asian-Americans	10	0	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=13)	8%	69%	15%	8%
Audio (N=12)	25	50	17	8
Computer (N=15)	7	47	33	13

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	44%	18	13%	15	0%	15
Humanities	31	16	47	15	6	16
Physical and biological sciences	35	17	7	14	31	13
Computer science	41	17	8	13	83	18
Math	6	16	0	14	47	15
Business	25	16	14	14	59	17
Engineering	37	16	8	13	40	15
Medicine	14	14	0	11	0	12
Law	0	13	9	11	0	12

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

CALIFORNIA

Table 1. Institutions Responding to Survey

Table 1. Institutions Responding to Survey	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
American River College		-				Δ
Armstrong College	-	-	-			
Art Center College of Design						Δ
Azusa Pacific University		-	-	V		
Barstow College	*	-				
Biola University						Δ
Brooks Institute	-	-	-			
Cabrillo College	-	-	-	C,V		
California Baptist College					Δ	Δ
California College of Podiatric Medicine						
California Institute of the Arts						Δ
California Institute of Integral Studies	-	-	-			
California Institute of Transpersonal Psychology			-			
California Lutheran College		*				
California Maritime Academy	-	-	-			
California School of Professional Psychology at Berkeley	-	-				Δ
California School of Professional Psychology at Fresno						Δ
California School of Professional Psychology at Los Angeles		-			Δ	Δ
California State College, Bakersfield			*	C	Δ	Δ
California State College, Stanislaus						
California State Polytechnic University, Pomona	-	-	*			
California State University, Dominguez Hills	*	-	*	C,V		Δ
California State University, Fresno	-	-	*	C		Δ
California State University, Fullerton			-			Δ
California State University, Hayward						
California State University, Long Beach			*	C		

STATE SUMMARY

CALIFORNIA
(cont.)

Table 1. Institutions Responding to Survey	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
California State University, Los Angeles			*	V		Δ
California State University, Northridge	-	-	-		Δ	Δ
Canada College		-			Δ	Δ
Cerro Coso Community College						Δ
Chabot College			-			Δ
Christ College Irvine						
Church Divinity School of the Pacific						
Claremont Graduate School	-	-				Δ
Cleveland Chiropractic College						
Coastline Community College	*			V		Δ
Cogswell College				C		Δ
College of Alameda	-	-				Δ
College of the Canyons	-	-	-			Δ
College of the Desert	*	-				Δ
College of Marin	-	-	-		Δ	
College of Osteopathic Medicine of the Pacific	-	-	-		Δ	Δ
College of the Redwoods						Δ
College of San Mateo	*	*	*	C,V		Δ
College of the Siskiyous	-	-	-			
Columbia College, Hollywood	-	-	-			
Compton Community College		-		C		
Cosumnes River College			-			Δ
Cuesta College	-	-	-			Δ
Cuyamaca College	-	-	-			
Cypress College		-		C	Δ	Δ
DeAnza College	*			C,V	Δ	Δ
Deep Springs College						
Diablo Valley College	*	*	*	a,C,V		Δ

STATE SUMMARY

CALIFORNIA
(cont.)

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Dominican College of San Rafael	-	-				
East Los Angeles College		-				Δ
Evergreen Valley College	*	-	-	v	Δ	Δ
Feather River College						
Fielding Institute	-	-				
Foothill College	-	-	*	a,c,v	Δ	Δ
Fresno City College	*	-				Δ
Fresno Pacific College			*		Δ	Δ
Golden Gate Baptist Theological Seminary			-			
Golden West College			*	c,v	Δ	Δ
Hartnell College		*				Δ
Harvey Mudd College	-	-	*	c	Δ	
Humboldt State University						Δ
The Institute for Advanced Study of Human Sexuality	*	*		a,v		Δ
Lake Tahoe Community College						
Laurence University						
Loma Linda University	-	-				Δ
Los Angeles Baptist College						Δ
Los Angeles College of Chiropractic						Δ
Los Angeles City College	*	*			Δ	Δ
Los Angeles Harbor College					Δ	Δ
Los Angeles Mission College	-	-				Δ
Los Angeles Pierce College	*	*	*	a,c,v	Δ	Δ
Los Angeles Southwest College						
Loyola Marymount University	-	-	-		Δ	Δ
Marymount Palos Verdes College	-	-			Δ	Δ
Merced College		*				

STATE SUMMARY

CALIFORNIA
(cont.)

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Merritt College	-	-	-			
Mills College			*	C	Δ	Δ
Monterey Institute of International Studies						
Moorpark College	-	-				Δ
Mount San Antonio College	-					Δ
National University	-	-	-		Δ	Δ
Northrop University					Δ	Δ
Orange Coast College			-		Δ	Δ
Oxnard College						Δ
Pacific Christian College	-	-	-			Δ
Pacific Graduate School of Psychology		-				
Pacific Lutheran Theological Seminary			-			
Pacific School of Religion	-	-	-			
Palo Verde College	-	-				
Palomar College	*	-		C,V	Δ	Δ
Pasadena City College	*	-		C,V	Δ	Δ
Pasadena College of Chiropractic	-	-	-			Δ
Patten College	-	-	-			
Pepperdine University			*	C	Δ	Δ
Point Loma Nazarene College					Δ	Δ
Pomona College	-	-	-		Δ	Δ
Rand Graduate Institute of Policy Studies					Δ	Δ
Riverside City College	-	-	-			Δ
Saint John's College	-	-	-			
St. Joseph's College	-	-	-			
Saint Mary's College of California						Δ
San Bernardino Valley College	-	-	-			Δ
San Diego City College						Δ

STATE SUMMARY

CALIFORNIA
(cont.)

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
San Diego Mesa College	*			c,v	Δ	Δ
San Diego Miramar College					Δ	Δ
San Francisco Community College District			*	c		Δ
San Francisco Conservatory of Music	-	-	-			
San Joaquin Delta College	-	-	-			
San Jose City College	-	-				
Santa Ana College	-	-		c	Δ	Δ
Santa Barbara City College		-			Δ	Δ
Santa Monica College						
Scripps College	-	-	-		Δ	
Sierra College			-			Δ
Simpson College	-	-	-			
Solano Community College						
Southern California College	-	-		c		
Southern California College of Optometry				c	Δ	Δ
Southwestern College		*			Δ	Δ
Southwestern University School of Law						
Stanford University	-	-	-	v		Δ
Starr King School for the Ministry						
Taft College	*	-	*	c,v	Δ	Δ
University of California, Davis	*	*	-	a,v		Δ
University of California, Irvine		*	-			
University of California, Riverside			-			Δ
University of California, San Francisco	-	-		v	Δ	Δ
University of California, Santa Barbara	*	*			Δ	Δ
University for Humanistic Studies						
University of Judaism		*		a,c		
University of LaVerne	-	-				Δ

STATE SUMMARY

CALIFORNIA
(cont.)

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
University of LaVerne, San Fernando Valley College of Law	-	-	-			
University of Redlands	-	-	-			
University of San Diego						Δ
University of Santa Clara	-	-	-		Δ	Δ
University of Southern California	*			v		Δ
Vista College	-	*	-	a		Δ
West Hills College	-	-			Δ	Δ
West Los Angeles College	*	-		v		Δ
West Valley College	-	-	-		Δ	Δ
Western Institute for Social Research			-			
Westmont College		-		c		
Whittier College			*	c	Δ	Δ
William Carey International University					Δ	
Woodbury University						
World College West	-	-				
Yuba College	*	-			Δ	Δ

Key to Symbols

- * among the top 20 percent in the West
- - no score computed because of missing data
- a audio courseware producer
- c computer software producer
- o "other" courseware producer
- v video courseware producer
- Δ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=153)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 4%							
Broadcast TV, public	20%	20%	9%	Satellite-receive	4%	1%	0%
Broadcast TV, commercial	18	14	7	Satellite-send	0	1	0
Cable TV, one-way	14	13	6	Videotext	4	1	1
Cable TV, interactive	3	1	0	Teletext	1	1	1
Instructional Television Fixed Service (ITFS)	11	9	3	Video teleconferencing (one-way video)	4	3	1
Point-to-point microwave	3	5	2	Video teleconferencing (two-way video)	1	2	1
Slow-scan, freeze-frame TV	2	1	0	Low power TV	2	0	0
Video cassette	85	22	21	Direct broadcast TV	6	2	1
Videodisc	12	3	2	Slides, overheads	78	23	22
Closed circuit TV	30	3	3				

B. Percentage of Institutions Using Audio Technologies (N=153)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 19%							
AM radio	3%	1%	0%	Audio teleconferencing	7%	3%	2%
FM radio, public	10	6	5	Regular telephone service	11	8	5
FM radio, commercial	4	1	1	Audiographics	1	0	0
SCA radio	1	0	0	Facsimile	1	0	0
Cable radio	2	1	1	Radio talkback	0	1	0
Audio cassette	68	25	24	Electronic blackboard	21	0	0

C. Percentage of Institutions Using Computer Technologies (N=153)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 14%							
Computer-assisted instruction (CAI)	69%	7%	6%	Computer-based training (CBT)	24%	3%	2%
Computer-managed instruction (CMI)	29	5	4	Computer conferencing	6	4	1
Computer-based instructional management (CBIM)	13	3	2	Electronic mail	20	6	3
Computer-assisted design (CAD)	31	1	1	Simulation/gaming	33	4	3
				Modeling	24	3	2
				Online bibliographic searches	40	7	5

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=153)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	17%	17%	7%
Workers, blue/pink collar	9	8	3
Handicapped or homebound	18	8	4
Older adults (age 55 plus)	12	8	3
Rural adults	4	5	1
High school dropouts	5	3	1
Incarcerated	3	4	1
Women	11	9	5
Blacks	10	7	4
Hispanics	11	8	5
American Indians	7	6	4
Eskimo	3	1	0
Asian-Americans	8	5	3

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=121)	3%	47%	34%	16%
Audio (N=108)	9	56	23	12
Computer (N=115)	7	36	44	12

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	54%	118	31%	107	27%	114
Humanities	49	117	39	110	15	111
Physical and biological sciences	51	107	26	92	45	111
Computer science	50	97	17	78	88	120
Math	24	96	16	82	60	110
Business	50	100	25	83	65	106
Engineering	23	79	9	66	49	83
Medicine	18	65	8	61	12	65
Law	8	63	3	57	10	59

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

COLORADO

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Adams State College			*	c		Δ
Aims Community College					Δ	Δ
Arapahoe Community College	*	-	-	v	Δ	Δ
Colorado Northwestern Community College	-	-				Δ
Colorado School of Mines	-	-			Δ	
Colorado State University	*	-	*	c,v	Δ	Δ
Colorado Technical College		-				
Community College of Denver, Red Rocks Campus	-	-	-			
Denver Auraria Community College	*	-	*	c,v	Δ	Δ
Denver Conservative Baptist Seminary	-	-	-			Δ
Fort Lewis College			-		Δ	Δ
Front Range Community College	*	-	-	a,v		
Intermountain Bible College	-	-	-			
Lamar Community College						
Loretto Heights College					Δ	Δ
Mesa College	-	-	-			
Metropolitan State College	*	*		v		Δ
Morgan Community College	-	-	*	c	Δ	
Naropa Institute	-	-	-	v		
Northeastern Junior College		-	-			Δ
Otero Junior College	-	-				
Pikes Peak Community College		*			Δ	Δ
Pueblo Community College			-			
University of Colorado, Boulder	-	-				Δ
University of Colorado, Colorado Springs						
University of Northern Colorado	-	-	*	c		Δ
University of Southern Colorado		-	-			Δ
Western Bible College		-		v	Δ	Δ

STATE SUMMARY

COLORADO
(cont.)

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Western State College of Colorado					△	△

Key to Symbols

* among the top 20 percent in the West
\- no score computed because of missing data
a audio courseware producer
c computer software producer
o "other" courseware producer
v video courseware producer
△ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=29)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 10%							
Broadcast TV, public	38%	20%	17%	Satellite-receive	10%	0%	0%
Broadcast TV, commercial	14	10	7	Satellite-send	0	3	0
Cable TV, one-way	27	13	10	Videotext	7	0	0
Cable TV, interactive	3	3	3	Teletext	7	0	0
Instructional Television Fixed Service (ITFS)	13	3	3	Video teleconferencing (one-way video)	10	0	0
Point-to-point microwave	0	0	0	Video teleconferencing (two-way video)	0	3	0
Slow-scan, freeze-frame TV	3	0	0	Low power TV	0	0	0
Video cassette	79	31	31	Direct broadcast TV	0	0	0
Videodisc	10	3	3	Slides, overheads	76	28	28
Closed circuit TV	34	3	3				

B. Percentage of Institutions Using Audio Technologies (N=29)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 31%							
AM radio	3%	3%	3%	Audio teleconferencing	6%	3%	3%
FM radio, public	7	7	7	Regular telephone service	14	7	7
FM radio, commercial	3	3	3	Audiographics	0	0	0
SCA radio	0	0	0	Facsimile	0	0	0
Cable radio	0	3	0	Radio talkback	3	3	3
Audio cassette	52	17	17	Electronic blackboard	7	7	7

C. Percentage of Institutions Using Computer Technologies (N=29)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 21%							
Computer-assisted instruction (CAI)	58%	10%	10%	Computer-based training (CBT)	17%	3%	3%
Computer-managed instruction (CMI)	24	7	7	Computer conferencing	3	6	3
Computer-based instructional management (CBIM)	20	3	3	Electronic mail	17	6	3
Computer-assisted design (CAD)	28	3	0	Simulation/gaming	38	7	7
				Modeling	28	0	0
				Online bibliographic searches	38	3	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=29)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	31%	31%	24%
Workers, blue/pink collar	31	21	21
Handicapped or homebound	17	10	7
Older adults (age 55 plus)	24	21	21
Rural adults	10	13	10
High school dropouts	10	3	3
Incarcerated	3	10	3
Women	31	24	24
Blacks	17	14	14
Hispanics	20	17	17
American Indians	17	14	14
Eskimo	3	3	3
Asian-Americans	17	14	14

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=23)	0%	43%	43%	13%
Audio (N=19)	5	58	32	5
Computer (N=22)	4	23	59	14

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	65%	23	50%	18	60%	20
Humanities	65	23	44	18	52	21
Physical and biological sciences	52	21	28	18	20	20
Computer science	52	21	17	18	18	22
Math	29	21	11	18	19	21
Business	50	22	22	18	19	21
Engineering	29	17	12	17	29	17
Medicine	14	14	7	14	0	13
Law	0	13	7	14	0	12

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

HAWAII

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Brigham Young University, Hawaii Campus					△	△
Chaminade University of Honolulu	-	-			△	△
Hawaii Loa College			-		△	△
University of Hawaii, Hilo						△
University of Hawaii, Honolulu Community College						
University of Hawaii, Kapiolani Community College	-	-	-			△
University of Hawaii, Kauai Community College	-	-			△	△
University of Hawaii, West Oahu College	-	-	-	o	△	
University of Hawaii, Windward Community College		*			△	△

Key to Symbols

* among the top 20 percent in the West
\- no score computed because of missing data
a audio courseware producer
c computer software producer
o "other" courseware producer
v video courseware producer
△ yes, have at institution

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=9)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	11%	0%	0%
Workers, blue/pink collar	11	0	0
Handicapped or homebound	0	0	0
Older adults (age 55 plus)	11	11	11
Rural adults	11	11	11
High school dropouts	11	11	11
Incarcerated	0	22	0
Women	11	11	11
Blacks	11	11	11
Hispanics	11	11	11
American Indians	0	0	0
Eskimo	0	0	0
Asian-Americans	11	11	11

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=6)	0%	33%	33%	33%
Audio (N=6)	0	67	17	17
Computer (N=7)	0	57	29	14

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	75%	8	12%	8	12%	8
Humanities	67	8	33	9	25	8
Physical and biological sciences	75	8	14	7	86	7
Computer science	62	8	0	7	100	8
Math	29	7	0	7	83	6
Business	62	8	43	7	62	8
Engineering	33	3	0	3	33	3
Medicine	33	3	33	3	0	3
Law	0	2	0	2	0	2

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

IDAHO

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Boise State University		-				Δ
College of Idaho	-	-	-			Δ
College of Southern Idaho	-	-	*	a,c	Δ	Δ
Idaho State University		-				Δ
North Idaho College		-		c,v		Δ
Northwest Nazarene College	-	-	-			Δ
Ricks College		*	*	c		Δ
University of Idaho	*	*	*	c,v	Δ	Δ

Key to Symbols

* among the top 20 percent in the West
\- no score computed because of missing data
a audio courseware producer
c computer software producer
o "other" courseware producer
v video courseware producer
Δ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=8)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 0%							
Broadcast TV, public	63%	38%	38%	Satellite-receive	38%	13%	13%
Broadcast TV, commercial	0	0	0	Satellite-send	0	0	0
Cable TV, one-way	50	38	25	Videotext	0	0	0
Cable TV, interactive	26	13	13	Teletext	13	0	0
Instructional Television Fixed Service (ITFS)	0	0	0	Video teleconferencing (one-way video)	25	0	0
Point-to-point microwave	13	26	13	Video teleconferencing (two-way video)	0	13	0
Slow-scan, freeze-frame TV	13	13	13	Low power TV	0	0	0
Video cassette	100	50	50	Direct broadcast TV	13	0	0
Videodisc	26	13	13	Slides, overheads	76	38	38
Closed circuit TV	50	25	25				

B. Percentage of Institutions Using Audio Technologies (N=8)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 0%							
AM radio	0%	0%	0%	Audio teleconferencing	13%	13%	0%
FM radio, public	26	13	13	Regular telephone service	38	25	25
FM radio, commercial	0	0	0	Audiographics	0	0	0
SCA radio	0	0	0	Facsimile	26	13	13
Cable radio	0	0	0	Radio talkback	0	0	0
Audio cassette	88	25	25	Electronic blackboard	13	0	0

C. Percentage of Institutions Using Computer Technologies (N=8)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 0%							
Computer-assisted instruction (CAI)	88%	13%	13%	Computer-based training (CBT)	13%	0%	0%
Computer-managed instruction (CMI)	25	0	0	Computer conferencing	0	0	0
Computer-based instructional management (CBIM)	13	0	0	Electronic mail	38	25	25
Computer-assisted design (CAD)	63	13	13	Simulation/gaming	51	13	13
				Modeling	26	13	13
				Online bibliographic searches	51	13	13

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=8)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	38%	63%	38%
Workers, blue/pink collar	25	50	25
Handicapped or homebound	0	13	0
Older adults (age 55 plus)	13	13	13
Rural adults	0	13	0
High school dropouts	0	0	0
Incarcerated	0	0	0
Women	0	13	0
Blacks	0	0	0
Hispanics	0	0	0
American Indians	0	0	0
Eskimo	0	0	0
Asian-Americans	0	0	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=7)	0%	43%	43%	14%
Audio (N=6)	33	33	33	0
Computer (N=7)	14	0	71	14

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	50%	6	29%	7	17%	6
Humanities	50	6	43	7	0	7
Physical and biological sciences	29	7	0	7	50	6
Computer science	50	6	0	6	88	8
Math	50	6	0	6	86	7
Business	63	8	0	7	88	8
Engineering	33	6	0	6	83	6
Medicine	25	4	0	3	0	4
Law	0	3	0	3	0	4

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

MONTANA

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Blackfeet Community College				a		△
Carroll College	-	-				
College of Great Falls					△	
Dawson Community College		*				△
Eastern Montana College						
Flathead Valley Community College	-	-				△
Montana College of Mineral Science and Technology		-	*		△	△
Northern Montana College			-			△
University of Montana	-	*	*			△
Western Montana College					△	

Key to Symbols

* among the top 20 percent in the West
\- no score computed because of missing data
a audio courseware producer
c computer software producer
o "other" courseware producer
v video courseware producer
△ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=10)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 0%							
Broadcast TV, public	20%	0%	0%	Satellite-receive	10%	0%	0%
Broadcast TV, commercial	10	10	0	Satellite-send	0	0	0
Cable TV, one-way	40	10	0	Videotext	0	0	0
Cable TV, interactive	0	0	0	Teletext	0	0	0
Instructional Television Fixed Service (ITFS)	0	0	0	Video teleconferencing (one-way video)	0	0	0
Point-to-point microwave	0	0	0	Video teleconferencing (two-way video)	10	0	0
Slow-scan, freeze-frame TV	0	0	0	Low power TV	0	0	0
Video cassette	90	30	30	Direct broadcast TV	0	0	0
Videodisc	30	0	0	Slides, overheads	70	40	40
Closed circuit TV	10	0	0				

B. Percentage of Institutions Using Audio Technologies (N=10)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 10%							
AM radio	0%	0%	0%	Audio teleconferencing	30%	0%	20%
FM radio, public	10	10	0	Regular telephone service	0	10	0
FM radio, commercial	0	0	0	Audiographics	10	10	10
SCA radio	0	0	0	Facsimile	0	0	0
Cable radio	0	0	0	Radio talkback	0	0	0
Audio cassette	50	30	20	Electronic blackboard	10	0	0

C. Percentage of Institutions Using Computer Technologies (N=10)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 0%							
Computer-assisted instruction (CAI)	100%	10%	10%	Computer-based training (CBT)	60%	10%	10%
Computer-managed instruction (CMI)	40	0	0	Computer conferencing	0	10	0
Computer-based instructional management (CBIM)	10	10	0	Electronic mail	20	10	0
Computer-assisted design (CAD)	10	10	0	Simulation/gaming	70	10	10
				Modeling	30	0	0
				Online bibliographic searches	50	10	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=10)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	40%	10%	10%
Workers, blue/pink collar	20	10	0
Handicapped or homebound	10	20	0
Older adults (age 55 plus)	10	20	10
Rural adults	0	10	0
High school dropouts	0	0	0
Incarcerated	0	20	0
Women	10	10	10
Blacks	0	0	0
Hispanics	0	0	0
American Indians	30	40	20
Eskimo	0	0	0
Asian-Americans	0	0	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=8)	13%	50%	25%	13%
Audio (N=7)	14	43	29	14
Computer (N=9)	0	56	33	11

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	50%	6	67%	6	0%	9
Humanities	33	6	71	7	0	8
Physical and biological sciences	33	6	0	6	33	9
Computer science	83	6	17	6	90	10
Math	50	6	17	6	60	10
Business	20	5	0	5	40	10
Engineering	14	7	0	5	38	8
Medicine	25	4	0	4	0	6
Law	25	4	0	4	14	7

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

NEVADA

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Old College						
University of Nevada, Las Vegas	*	-	*			Δ
University of Nevada, Reno		*	*			Δ
Western Nevada Community College						

Key to Symbols

- * among the top 20 percent in the West
- - no score computed because of missing data
- a audio courseware producer
- c computer software producer
- o "other" courseware producer
- v video courseware producer
- Δ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=4)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 0%							
Broadcast TV, public	0%	50%	0%	Satellite-receive	50%	0%	0%
Broadcast TV, commercial	0	0	0	Satellite-send	0	0	0
Cable TV, one-way	25	25	0	Videotext	0	0	0
Cable TV, interactive	25	0	0	Teletext	0	0	0
Instructional Television Fixed Service (ITFS)	0	0	0	Video teleconferencing (one-way video)	25	25	25
Point-to-point microwave	0	0	0	Video teleconferencing (two-way video)	0	0	0
Slow-scan, freeze-frame TV	0	0	0	Low power TV	0	0	0
Video cassette	100	75	75	Direct broadcast TV	0	0	0
Videodisc	25	0	0	Slides, overheads	100	75	75
Closed circuit TV	50	0	0				

B. Percentage of Institutions Using Audio Technologies (N=4)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 25%							
AM radio	0%	0%	0%	Audio teleconferencing	50%	50%	50%
FM radio, public	0	0	0	Regular telephone service	25	25	25
FM radio, commercial	0	0	0	Audiographics	0	0	0
SCA radio	0	0	0	Facsimile	25	0	0
Cable radio	0	0	0	Radio talkback	0	0	0
Audio cassette	75	75	75	Electronic blackboard	0	0	0

C. Percentage of Institutions Using Computer Technologies (N=4)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 25%							
Computer-assisted instruction (CAI)	50%	0%	0%	Computer-based training (CBT)	50%	25%	25%
Computer-managed instruction (CMI)	25	25	25	Computer conferencing	25	25	25
Computer-based instructional management (CBIM)	25	0	0	Electronic mail	50	50	50
Computer-assisted design (CAD)	50	0	0	Simulation/gaming	50	25	25
				Modeling	50	25	25
				Online bibliographic searches	50	25	25

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=4)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	0%	50%	0%
Workers, blue/pink collar	0	25	0
Handicapped or homebound	0	0	0
Older adults (age 55 plus)	0	0	0
Rural adults	0	25	0
High school dropouts	0	0	0
Incarcerated	0	0	0
Women	0	0	0
Blacks	0	0	0
Hispanics	0	0	0
American Indians	0	0	0
Eskimo	0	0	0
Asian-Americans	0	0	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=4)	25%	25%	50%	0%
Audio (N=4)	25	50	25	0
Computer (N=4)	25	25	50	0

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	50%	4	25%	4	25%	4
Humanities	25	4	25	4	25	4
Physical and biological sciences	50	4	25	4	25	4
Computer science	75	4	25	4	50	4
Math	50	4	25	4	25	4
Business	75	4	0	4	50	4
Engineering	50	4	0	4	25	4
Medicine	0	3	25	4	25	4
Law	0	3	0	4	0	4

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

NEW MEXICO

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
College of Santa Fe	-	-			△	△
Eastern New Mexico University, Main Campus		-	*		△	△
Eastern New Mexico University, Roswell				C	△	△
New Mexico Military Institute					△	△
New Mexico State University, Alamogordo Branch						
New Mexico State University, Carlsbad Branch	-	-	-			
New Mexico State University, Main Campus						
Northern New Mexico Community College						
San Juan College						△
University of New Mexico, Main Campus	-	-	-	C		△
Western New Mexico University						△

Key to Symbols

* among the top 20 percent in the West
\- no score computed because of missing data
a audio courseware producer
c computer software producer
o "other" courseware producer
v video courseware producer
△ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=11)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 18%							
Broadcast TV, public	27%	18%	9%	Satellite-receive	27%	0%	0%
Broadcast TV, commercial	18	0	0	Satellite-send	0	0	0
Cable TV, one-way	27	9	0	Videotext	0	0	0
Cable TV, interactive	9	0	0	Teletext	9	0	0
Instructional Television Fixed Service (ITFS)	18	0	0	Video teleconferencing (one-way video)	18	0	0
Point-to-point microwave	9	9	0	Video teleconferencing (two-way video)	18	0	0
Slow-scan, freeze-frame TV	0	0	0	Low power TV	0	0	0
Video cassette	82	18	18	Direct broadcast TV	18	0	0
Videodisc	18	0	0	Slides, overheads	63	18	18
Closed circuit TV	36	0	0				

B. Percentage of Institutions Using Audio Technologies (N=11)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 27%							
AM radio	0%	0%	0%	Audio teleconferencing	18%	9%	0%
FM radio, public	18	0	0	Regular telephone service	18	0	0
FM radio, commercial	0	0	0	Audiographics	0	0	0
SCA radio	0	0	0	Facsimile	0	0	0
Cable radio	0	0	0	Radio talkback	0	0	0
Audio cassette	63	18	18	Electronic blackboard	0	0	0

C. Percentage of Institutions Using Computer Technologies (N=11)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 18%							
Computer-assisted instruction (CAI)	73%	0%	0%	Computer-based training (CBT)	36%	0%	0%
Computer-managed instruction (CMI)	36	0	0	Computer conferencing	9	9	0
Computer-based instructional management (CBIM)	18	0	0	Electronic mail	27	0	0
Computer-assisted design (CAD)	36	0	0	Simulation/gaming	36	0	0
				Modeling	9	9	0
				Online bibliographic searches	73	0	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=11)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	27%	36%	18%
Workers, blue/pink collar	9	18	9
Handicapped or homebound	9	0	0
Older adults (age 55 plus)	18	18	0
Rural adults	0	18	0
High school dropouts	18	0	0
Incarcerated	9	0	0
Women	18	9	9
Blacks	18	0	0
Hispanics	27	9	9
American Indians	18	0	0
Eskimo	0	0	0
Asian-Americans	9	9	9

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=9)	0%	56%	11%	33%
Audio (N=9)	0	67	22	11
Computer (N=10)	0	40	50	10

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	50%	10	30%	10	20%	10
Humanities	67	9	50	10	36	11
Physical and biological sciences	50	10	30	10	64	11
Computer science	50	10	11	9	100	11
Math	20	10	11	9	73	11
Business	30	10	33	9	73	11
Engineering	25	8	25	8	40	5
Medicine	29	7	14	7	25	4
Law	14	7	14	7	0	4

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

OREGON

Table 1. Institutions Responding to Survey	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Bassist College			-		Δ	
Blue Mountain Community College	*	-			Δ	Δ
Chemeketa Community College	*	-	*	C,V	Δ	Δ
Clackamas Community College					Δ	Δ
Clatsop Community College					Δ	
Columbia Christian College					Δ	Δ
Concordia College						Δ
Eastern Oregon State College	-	-	-		Δ	Δ
Eugene Bible College	-	-	-			
George Fox College	-	-		V		Δ
Lane Community College	*	-		V		Δ
Linfield College		-	-			Δ
Linn-Benton Community College		-				Δ
Mount Hood Community College		-			Δ	Δ
Northwest Christian College						
Oregon Graduate Center		-	-	V		Δ
Oregon Health Sciences University		*		V		Δ
Oregon Institute of Technology						Δ
Oregon State University		-	*	C,V		Δ
Pacific Northwest College of Art	-	-	-			
Pacific University					Δ	Δ
Portland Community College	*	*		C,V		Δ
Portland State University	*		*	C,V		Δ
Reed College			*	C	Δ	Δ
Rogue Community College	-	*			Δ	Δ
Southern Oregon State College			*	C,V	Δ	Δ
Southwestern Oregon Community College					Δ	Δ
Umpqua Community College					Δ	

STATE SUMMARY

OREGON
(cont.)

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
University of Oregon			-			△
University of Portland			*			△
Western Conservative Baptist Seminary		-	-			△
Western Evangelical Seminary						
Western Oregon State College	*		*	c,v		△
Western State Chiropractic College		*		a,c		

Key to Symbols

* among the top 20 percent in the West
\- no score computed because of missing data
a audio courseware producer
c computer software producer
o "other" courseware producer
v video courseware producer
△ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=34)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 0%							
Broadcast TV, public	42%	27%	18%	Satellite-receive	18%	3%	3%
Broadcast TV, commercial	21	3	0	Satellite-send	0	0	0
Cable TV, one-way	30	21	15	Videotext	0	0	0
Cable TV, interactive	0	3	0	Teletext	3	0	0
Instructional Television Fixed Service (ITFS)	6	0	0	Video teleconferencing (one-way video)	15	0	0
Point-to-point microwave	0	0	0	Video teleconferencing (two-way video)	0	0	0
Slow-scan, freeze-frame TV	6	0	0	Low power TV	0	0	0
Video cassette	91	47	47	Direct broadcast TV	0	0	0
Videodisc	24	3	3	Slides, overheads	82	32	32
Closed circuit TV	32	0	0				

B. Percentage of Institutions Using Audio Technologies (N=34)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 18%							
AM radio	0%	0%	0%	Audio teleconferencing	27%	9%	9%
FM radio, public	9	0	0	Regular telephone service	18	15	9
FM radio, commercial	0	0	0	Audiographics	0	0	0
SCA radio	0	0	0	Facsimile	0	0	0
Cable radio	0	0	0	Radio talkback	0	0	0
Audio cassette	70	35	32	Electronic blackboard	3	3	3

C. Percentage of Institutions Using Computer Technologies (N=34)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 9%							
Computer-assisted instruction (CAI)	74%	18%	15%	Computer-based training (CBT)	21%	9%	6%
Computer-managed instruction (CMI)	33	9	9	Computer conferencing	6	3	0
Computer-based instructional management (CBIM)	9	0	0	Electronic mail	21	3	3
Computer-assisted design (CAD)	38	0	0	Simulation/gaming	38	6	6
				Modeling	38	6	6
				Online bibliographic searches	53	12	12

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=34)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	33%	39%	24%
Workers, blue/pink collar	15	18	9
Handicapped or homebound	21	24	15
Older adults (age 55 plus)	18	30	15
Rural adults	9	33	9
High school dropouts	18	12	9
Incarcerated	3	6	3
Women	15	24	12
Blacks	6	6	3
Hispanics	9	6	3
American Indians	9	6	3
Eskimo	6	3	0
Asian-Americans	15	12	6

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N-31)	3%	58%	19%	19%
Audio (N=29)	7	69	21	3
Computer (N=30)	7	37	47	10

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	67%	27	25%	24	32%	25
Humanities	41	27	26	27	12	25
Physical and biological sciences	66	29	22	23	75	28
Computer science	50	26	5	21	76	29
Math	33	24	5	19	56	27
Business	54	24	13	23	75	24
Engineering	33	18	0	16	48	21
Medicine	25	16	17	18	6	18
Law	7	14	0	16	0	17

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

UTAH

Table 1. Institutions Responding to Survey

Institutions Responding to Survey	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Brigham Young University, Main Campus	-	-	*	a,c,v		Δ
Dixie College					Δ	Δ
Latter Day Saints Business College						
Snow College	-	-	-			
University of Utah	*				Δ	
Utah State University		*				Δ
Utah Technical College, Provo		-				Δ
Weber State College	*					Δ
Westminster College of Salt Lake City						

Key to Symbols

- * among the top 20 percent in the West
- - no score computed because of missing data
- a audio courseware producer
- c computer software producer
- o "other" courseware producer
- v video courseware producer
- Δ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=9)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 0%							
Broadcast TV, public	22%	33%	22%	Satellite-receive	33%	22%	11%
Broadcast TV, commercial	22	11	11	Satellite-send	0	11	0
Cable TV, one-way	66	33	33	Videotext	11	11	11
Cable TV, interactive	11	0	0	Teletext	0	0	0
Instructional Television Fixed Service (ITFS)	22	0	0	Video teleconferencing (one-way video)	33	11	0
Point-to-point microwave	11	44	11	Video teleconferencing (two-way video)	0	11	0
Slow-scan, freeze-frame TV	0	11	0	Low power TV	0	0	0
Video cassette	100	78	78	Direct broadcast TV	0	11	0
Videodisc	44	11	11	Slides, overheads	100	56	56
Closed circuit TV	67	11	11				

B. Percentage of Institutions Using Audio Technologies (N=9)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 11%							
AM radio	0%	0%	0%	Audio teleconferencing	33%	22%	22%
FM radio, public	22	22	22	Regular telephone service	33	11	11
FM radio, commercial	0	0	0	Audiographics	0	0	0
SCA radio	11	11	11	Facsimile	0	0	0
Cable radio	0	0	0	Radio talkback	0	0	0
Audio cassette	89	56	56	Electronic blackboard	0	33	0

C. Percentage of Institutions Using Computer Technologies (N=9)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 11%							
Computer-assisted instruction (CAI)	89%	11%	11%	Computer-based training (CBT)	11%	0%	0%
Computer-managed instruction (CMI)	44	0	0	Computer conferencing	11	11	11
Computer-based instructional management (CBIM)	11	0	0	Electronic mail	44	11	11
Computer-assisted design (CAD)	33	0	0	Simulation/gaming	22	0	0
				Modeling	44	11	11
				Online bibliographic searches	44	11	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=9)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	33%	44%	0%
Workers, blue/pink collar	11	22	0
Handicapped or homebound	0	11	0
Older adults (age 55 plus)	11	0	0
Rural adults	0	0	0
High school dropouts	22	0	0
Incarcerated	11	0	0
Women	11	0	0
Blacks	0	0	0
Hispanics	0	0	0
American Indians	22	11	11
Eskimo	0	0	0
Asian-Americans	0	0	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=8)	0%	37%	50%	12%
Audio (N=8)	0	50	25	25
Computer (N=8)	0	50	50	0

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	100%	8	71%	7	14%	7
Humanities	62	8	67	9	29	7
Physical and biological sciences	75	8	37	8	57	7
Computer science	86	7	14	7	100	9
Math	37	8	14	7	57	7
Business	75	8	29	7	75	8
Engineering	25	4	40	5	80	5
Medicine	67	3	50	2	0	0
Law	0	3	0	2	100	1

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

WASHINGTON

Table 1. Institutions Responding to Survey

Institutions Responding to Survey	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/Training	Task Force
Bellevue Community College	-	-	-			Δ
Big Bend Community College		-			Δ	
Central Washington University	-	-				
Centralia College					Δ	
Clark College	*	-	-	V	Δ	Δ
Cornish Institute			-			
Eastern Washington University	-	-	-			Δ
Edmonds Community College					Δ	Δ
Everett Community College	*	*		a,C,V	Δ	Δ
Fort Steilacoom Community College	-	-	-			Δ
Gonzaga University			-			Δ
Green River Community College						Δ
Griffin College	-	-	-		Δ	Δ
Heritage College	-	-	-			
Highline Community College	-	-			Δ	Δ
Lower Columbia College	-	-				Δ
Northwest College of the Assemblies of God	-	-	-			
Olympic College						
Pacific Lutheran University			-		Δ	Δ
Peninsula College					Δ	
Puget Sound College of the Bible			-			
Saint Martin's College			*		Δ	Δ
Seattle Community College, North		-			Δ	Δ
Seattle Community College, South	-	-	-	O	Δ	Δ
Seattle Pacific University	*	*			Δ	Δ
Seattle University				C		Δ
Shoreline Community College	-	-				Δ
Skagit Valley College	-	-	-		Δ	Δ

STATE SUMMARY

WASHINGTON
(cont.)

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
South Puget Sound Community College	*	-	-		Δ	Δ
Spokane Community College[1]	-	-	-			
Spokane Falls Community College[1]	-	-	-			
Tacoma Community College	*					Δ
University of Puget Sound					Δ	Δ
University of Washington	*	-	*	c,v		Δ
Walla Walla Community College	-	-	-			Δ
Walla Walla College			-			
Washington State University		*	*		Δ	Δ
Wenatchee Valley College			*	c,v		Δ
Western Washington University		-	*	c		Δ
Whatcom Community College				a,c,v	Δ	Δ
Whitworth College						Δ
Yakima Valley Community College		-	-		Δ	

[1]Data for these institutions were submitted for the two-institution district, and therefore could not be included in the institution-based analysis.

Key to Symbols

- * among the top 20 percent in the West
- - no score computed because of missing data
- a audio courseware producer
- c computer software producer
- o "other" courseware producer
- v video courseware producer
- Δ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=40)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 5%							
Broadcast TV, public	33%	31%	18%	Satellite-receive	6%	8%	3%
Broadcast TV, commercial	31	18	8	Satellite-send	0	0	0
Cable TV, one-way	23	25	10	Videotext	0	0	0
Cable TV, interactive	3	3	0	Teletext	0	0	0
Instructional Television Fixed Service (ITFS)	3	0	0	Video teleconferencing (one-way video)	15	5	0
Point-to-point microwave	0	5	0	Video teleconferencing (two-way video)	3	3	3
Slow-scan, freeze-frame TV	0	3	0	Low power TV	0	0	0
Video cassette	93	38	38	Direct broadcast TV	8	6	3
Videodisc	8	3	3	Slides, overheads	88	46	43
Closed circuit TV	38	0	0				

B. Percentage of Institutions Using Audio Technologies (N=40)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 12%							
AM radio	3%	0%	0%	Audio teleconferencing	21%	13%	8%
FM radio, public	13	8	5	Regular telephone service	20	15	10
FM radio, commercial	0	0	0	Audiographics	3	0	0
SCA radio	0	0	0	Facsimile	0	0	0
Cable radio	0	0	0	Radio talkback	0	0	0
Audio cassette	83	38	35	Electronic blackboard	0	0	0

C. Percentage of Institutions Using Computer Technologies (N=40)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 0%							
Computer-assisted instruction (CAI)	71%	18%	18%	Computer-based training (CBT)	16%	6%	3%
Computer-managed instruction (CMI)	43	10	10	Computer conferencing	5	3	0
Computer-based instructional management (CBIM)	20	5	5	Electronic mail	33	18	10
Computer-assisted design (CAD)	35	3	0	Simulation/gaming	48	8	5
				Modeling	28	3	3
				Online bibliographic searches	56	18	18

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=40)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	23%	35%	10%
Workers, blue/pink collar	13	16	3
Handicapped or homebound	13	10	0
Older adults (age 55 plus)	13	8	3
Rural adults	5	10	0
High school dropouts	11	8	3
Incarcerated	0	15	0
Women	18	5	0
Blacks	13	0	0
Hispanics	10	3	0
American Indians	10	0	0
Eskimo	3	3	0
Asian-Americans	13	0	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=33)	3%	35%	27%	15%
Audio (N=29)	10	66	17	7
Computer (N=30)	0	53	40	7

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	62%	34	30%	30	28%	29
Humanities	42	33	44	32	7	27
Physical and biological sciences	60	30	10	29	47	32
Computer science	59	29	0	26	97	33
Math	35	29	0	27	64	33
Business	55	31	21	28	70	33
Engineering	32	28	0	27	43	30
Medicine	38	24	8	25	4	23
Law	6	18	0	20	0	20

* Medium and high use scores were combined.
** Number of respondents.

STATE SUMMARY

WYOMING

Table 1. Institutions Responding to Survey

	High Video Use	High Audio Use	High Computer Use	Courseware Producer	Faculty Incentives/ Training	Task Force
Casper College			*	C	Δ	Δ
Central Wyoming College			-	V		
Eastern Wyoming College					Δ	Δ
Laramie County Community College				a,C,V	Δ	Δ
University of Wyoming[1]				V	Δ	Δ
Western Wyoming Community College	-	-	-			

[1]Responses from the University of Wyoming are included in this state summary but were not figured into the overall report for the region because of late receipt of the completed questionnaire.

Key to Symbols

- * among the top 20 percent in the West
- - no score computed because of missing data
- a audio courseware producer
- c computer software producer
- o "other" courseware producer
- v video courseware producer
- Δ yes, have at institution

Table 2. Instructional Use of Video, Audio, and Computer Technologies

A. Percentage of Institutions Using Video Technologies (N=6)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 0%							
Broadcast TV, public	34%	17%	17%	Satellite-receive	17%	0%	0%
Broadcast TV, commercial	17	0	0	Satellite-send	0	0	0
Cable TV, one-way	17	17	0	Videotext	0	0	0
Cable TV, interactive	0	0	0	Teletext	0	17	0
Instructional Television Fixed Service (ITFS)	0	0	0	Video teleconferencing (one-way video)	17	0	0
Point-to-point microwave	0	0	0	Video teleconferencing (two-way video)	0	17	0
Slow-scan, freeze-frame TV	17	0	0	Low power TV	0	0	0
Video cassette	50	17	17	Direct broadcast TV	0	0	0
Videodisc	0	0	0	Slides, overheads	50	34	17
Closed circuit TV	17	0	0				

B. Percentage of Institutions Using Audio Technologies (N=6)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 17%							
AM radio	34%	17%	17%	Audio teleconferencing	0%	0%	0%
FM radio, public	34	17	17	Regular telephone service	17	17	17
FM radio, commercial	17	0	0	Audiographics	0	0	0
SCA radio	0	0	0	Facsimile	0	0	0
Cable radio	0	0	0	Radio talkback	0	0	0
Audio cassette	17	34	17	Electronic blackboard	0	0	0

C. Percentage of Institutions Using Computer Technologies (N=6)

	On Campus	Off Campus	Both On* and Off		On Campus	Off Campus	Both On* and Off
None -- 0%							
Computer-assisted instruction (CAI)	67%	17%	17%	Computer-based training (CBT)	33%	0%	0%
Computer-managed instruction (CMI)	33	0	0	Computer conferencing	0	0	0
Computer-based instructional management (CBIM)	17	0	0	Electronic mail	0	0	0
Computer-assisted design (CAD)	67	0	0	Simulation/gaming	50	0	0
				Modeling	50	0	0
				Online bibliographic searches	17	0	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 3. Percentage of Institutions Offering Targeted Instruction to Special Populations Via Information Technologies (N=6)

Population Served	On Campus	Off Campus	Both On* and Off
Professionals, white collar	0%	17%	0%
Workers, blue/pink collar	34	34	17
Handicapped or homebound	17	17	0
Older adults (age 55 plus)	0	0	0
Rural adults	17	17	0
High school dropouts	0	0	0
Incarcerated	0	17	0
Women	17	34	17
Blacks	0	0	0
Hispanics	0	0	0
American Indians	17	17	17
Eskimo	0	0	0
Asian-Americans	0	0	0

* The percentage for "both on and off" campus is included in the individual "on campus" and "off campus" percentages.

Table 4. Percentage of Students Using Information Technologies for Instruction

	Percentage of Institution's Student Population			
	None	1-20%	21-60%	61-100%
Video (N=5)	20%	60%	20%	0%
Audio (N=5)	20	60	20	0
Computer (N=4)	0	0	75	25

Table 5. Curriculum Areas with High* Utilization of Information Technologies

	Video		Audio		Computer	
	%	N=**	%	N=**	%	N=**
Social sciences	20%	5	25%	4	50%	4
Humanities	20	5	40	5	25	4
Physical and biological sciences	75	4	0	4	80	5
Computer science	50	4	0	3	80	5
Math	0	3	0	3	50	4
Business	33	3	0	3	80	5
Engineering	50	4	0	3	75	4
Medicine	33	3	0	3	33	3
Law	0	3	0	3	0	4

* Medium and high use scores were combined.
** Number of respondents.

Appendix A

METHODOLOGY

The institutional survey was sent to the chief academic officer at all 575 colleges and universities in the 13 western states. Follow-up letters were sent to those who did not return completed questionnaires by the deadline.

Much of the survey data merely describe institutional activities associated with the use of information technologies. For this type of data various cross-tabulations were used to assist in the analysis.

In order to further explore the responses to the policy questions, we wanted to determine whether the responses to the policy questions varied based on the extent of an institution's use of technology. We selected three different ways to divide the population: (1) telecourse users and non-users, (2) institutions with and without working relationships with public broadcasters, and (3) the percent of students at the institution using computer, video, or audio technology in their instructional programs.

We compared the responses of each set of groups (e.g., telecourse users and non-users) on each policy question item. To test their association with each other we used a chi-square based on a two-by-two contingency table. If the value of the chi-square (with one degree of freedom) exceeded the value for .10 probability, we included the item in the table. If the value was greater, we did not include the item in the table and did not comment on it. Similarly, for the percentage of learners served by video, audio, and computer technologies we compared the responses of three groups (low, medium, and high percentage of students served). We calculated the chi-square for each group on each policy item. If the chi-square value (with two degrees of freedom) exceeded the value for .10 probability, we included it in a table.

The analysis revealed some clear patterns when the population was broken into telecourse users and non-users and into those institutions with and without working relationships with public broadcasting agencies. These data are described in Section IV.

The patterns were not as clear-cut when we divided the population into low (0-10 percent), moderate (11-40 percent), and high (41-100 percent) groups based on their responses to a question about the percentage of students using each of the three major technology categories (computer, video, and audio) in their instructional programs. The data used for dividing the population into these three groups appear in Table 16.

In those cases where we were comparing institutions based on the percentage of student use (e.g., 11-40 percent use computers in their instructional program) we sometimes found items where the difference between groups was statistically significant but there was no obvious explanation for the differences. In numerous cases the responses to an item by those in the lowest technology use category were more similar to those in the highest use group than to those in the middle group.

The frequency with which this pattern appears in the analysis suggests that either institutions do not differ in a predictable manner along this dimension or, as is more likely the case, the question we used to sort groups may not have adequately accomplished its objective. In either case we did not have sufficient confidence in the resulting data to include it in this report.

Appendix B

INSTITUTIONAL SURVEY QUESTIONNAIRE

Please return to WICHE by June 22, 1984

ALASKA ARIZONA CALIFORNIA COLORADO HAWAII IDAHO MONTANA
NEVADA NEW MEXICO OREGON UTAH WASHINGTON WYOMING

INFORMATION TECHNOLOGIES

Survey of Instructional Uses

In Higher Education

PACIFIC MOUNTAIN NETWORK

WICHE
Improving Education in The West

This survey is about the use of video, audio, and computer technologies in the delivery of higher education coursework by your institution. WICHE and PMN are attempting to provide opportunities for collaboration, networking, and mutual support; therefore, even though the information requested may not be readily available, you are asked to approximate answers where actual statistics are not available. There are five sections: **1. Institution; 2. Information Technologies; 3. Instructional Applications; 4. Factors Affecting the Use of Information Technologies; and 5. Special Features and Plans.** Please mark the most accurate choice (X) in sections 1-4, and provide the requested information in section 5. You are encouraged to add information or amplify your answers wherever it is necessary. Add sheets to the survey and number your additions to correspond with the number of the question (e.g. 2.A.21). The summary of the results will be distributed to all institutions who complete the survey.

Definitions of some terms used in the survey:

Consortium (formal): a contractual collaborative relationship between two or more organizations.

Consortium (informal): an ongoing non-contractual collaborative relationship between two or more organizations.

Courseware: the print and electronic media components of instruction delivered by video, audio, or computer technology.

Information technology: a general term used in this survey to refer to all audio, video and computer technology.

Network: a general term used to refer to two-way communications among educators via electronic or conventional means.

Telecourse: a combination of print and electronic (video or audio) components that are designed to provide a student with the equivalent of a regular classroom based course. Texts and student study guides are generally accompanied by roughly 10-15 hours of video or audio instruction and some classroom experience.

© Copyright. The Western Interstate Commission for Higher Education, 1984. All rights reserved.

Information Technologies: Survey of
Instructional Uses in Higher Education

1. Institution

HEGIS CODE: _____

A. Name: _____

B. Total FTE enrollment _____

C. Type and level of institution. Highest level offered is (Mark one):

		Public	Private
1.	Two year (but less than four)	1. ___	___
2.	Four- or five-year baccalaureate	2. ___	___
3.	First-professional degree	3. ___	___
4.	Master's or beyond master's but less than doctorate	4. ___	___
5.	Doctorate	5. ___	___
6.	Undergraduate or graduate, non-degree granting	6. ___	___

2. Information Technologies

A. Does your institution use any of the following video technologies to deliver instruction to learners either on-campus or off-campus? (Mark all that apply.)

		ON	OFF
1.	None	1. ___	
2.	Broadcast TV, public	2. ___	___
3.	Broadcast TV, commercial	3. ___	___
4.	Cable TV, one-way	4. ___	___
5.	Cable TV, interactive	5. ___	___
6.	Instructional Television Fixed Service (ITFS)	6. ___	___
7.	Point-to point microwave	7. ___	___
8.	Slow-scan, freeze-frame TV	8. ___	___
9.	Video cassette	9. ___	___
10.	Videodisc	10. ___	___
11.	Closed circuit TV	11. ___	___
12.	Satellite-receive	12. ___	___
13.	Satellite-send	13. ___	___
14.	Videotext	14. ___	___
15.	Teletext	15. ___	___
16.	Video teleconferencing (one-way video)	16. ___	___
17.	Video teleconferencing (two-way video)	17. ___	___
18.	Low power TV	18. ___	___
19.	Direct Broadcast TV	19. ___	___
20.	Slides, overheads	20. ___	___
21.	Other (describe)	21. ___	___

_____

B. Does your institution use any of the following audio technologies to deliver instruction to learners either on-campus or off-campus? (Mark all that apply.)

		ON	OFF
1.	None	1. ___	
2.	AM Radio	2. ___	___
3.	FM Radio, public	3. ___	___
4.	FM Radio, commercial	4. ___	___
5.	SCA Radio	5. ___	___
6.	Cable Radio	6. ___	___
7.	Audio cassette	7. ___	___
8.	Audio teleconferencing	8. ___	___
9.	Regular telephone service	9. ___	___
10.	Audiographics	10. ___	___
11.	Facsimile	11. ___	___
12.	Radio talkback	12. ___	___
13.	Electronic Blackboard	13. ___	___
14.	Other (describe)	14. ___	___

_____

C. Does your institution use any of the following computer technologies to deliver instruction to learners either on-campus or off-campus? (Mark all that apply.)

		ON	OFF
1.	None	1. ___	
2.	Computer-assisted instruction (CAI)	2. ___	___
3.	Computer-managed instruction (CMI)	3. ___	___
4.	Computer-based instructional management (CBIM)	4. ___	___
5.	Computer-assisted design (CAD)	5. ___	___
6.	Computer-based training (CBT)	6. ___	___
7.	Computer conferencing	7. ___	___
8.	Electronic mail	8. ___	___
9.	Simulation/gaming	9. ___	___
10.	Modeling	10. ___	___
11.	Online bibliographic searches	11. ___	___
12.	Other (describe)	12. ___	___

_____

D. Does your institution use any of the following computer hardware to deliver instruction to learners other than computer science students? (Mark the degree of such use: ? = don't know; 0 = none; L = low; M = medium; H = high.)

		?	0	L	M	H
1.	Main-frame computers	1. ___	___	___	___	___
2.	Minicomputers	2. ___	___	___	___	___

		?	0	L	M	H
3. Microcomputers (stand alone)	3.	__	__	__	__	__
4. Microcomputers (network)	4.	__	__	__	__	__
5. Time-sharing terminals	5.	__	__	__	__	__
6. Other (describe)	6.	__	__	__	__	__

E. Does your institution make use of any of the following combinations of technologies in order to deliver instruction? (Mark all that apply.)

1. Broadcast or cable TV/audio teleconferencing.	1. __
2. Broadcast or cable TV/audiotape	2. __
3. Broadcast or cable TV/radio	3. __
4. Audio teleconferencing/videotape	4. __
5. Audio teleconferencing/slides, overheads	5. __
6. Audio teleconferencing/slow-scan TV	6. __
7. Audio teleconferencing/facsimile	7. __
8. Audio teleconferencing/videotext	8. __
9. Audio teleconferencing/electronic mail	9. __
10. Audiotape/telephone	10. __
11. Radio/telephone	11. __
12. Computer/videotape	12. __
13. Computer/videodisc	13. __
14. Computer/cable TV	14. __
15. Computer/broadcast TV	15. __
16. Computer/audiotape	16. __
17. Computer/telephone	17. __
18. Computer/facsimile	18. __
19. Other (describe)	19. __

F. Does your institution have an ongoing formal (contractual) or informal working relationship with a local or state public television agency? (Mark one.)

1. Don't know __ 2. No __
3. Formal (contractual) __ 4. Informal __
5. College is licensee __

G. Does your institution have an ongoing formal (contractual) or informal working relationship with a local or state public radio agency? (Mark one.)

1. Don't know __ 2. No __
3. Formal (contractual) __ 4. Informal __
5. College is licensee __

H. Does your institution participate in any information technology networks or consortia? (Mark one.)

1. No (mark and proceed to question 3.A) __
2. Yes (mark and proceed to 2.I and 2.J) __

I. Does your institution participate in any of the following types of networks or consortia? (Mark all that apply: L = local, S = statewide, N = national.)

		L	S	N
1. Radio network	1.	__	__	__
2. Broadcast video network	2.	__	__	__
3. Non-broadcast video network	3.	__	__	__
4. Audio teleconferencing network	4.	__	__	__
5. Computer network	5.	__	__	__
6. Cable television consortium	6.	__	__	__
7. Video telecourse consortium	7.	__	__	__
8. Video teleconferencing consortium	8.	__	__	__
9. Other (describe)	9.	__	__	__

J. Please indicate the name (or acronym, if well known) of any formal (contractual) or informal collaborative efforts in which your institution participates with other institutions or organizations to deliver instruction via information technology.

3. **Instructional Applications**

A. For what instructional purpose does your institution use video, audio or computer technologies? (Mark degree of such use: ? = don't know; 0 = none; L = low; M = medium; H = high.)

		?	0	L	M	H
1. Lower division undergraduate	1.	__	__	__	__	__
2. Upper division undergraduate	2.	__	__	__	__	__
3. Vocational/technical education	3.	__	__	__	__	__
4. Graduate education	4.	__	__	__	__	__

		?	0	L	M	H
5. Professional continuing education	5.					
6. Adult continuing education	6.					
7. Adult basic education	7.					
8. Public service programming	8.					
9. Education/career information	9.					
10. Counseling	10.					
11. Assessment	11.					
12. Other (describe)	12.					

B. Which curriculum areas make heaviest use of video, audio and computer technologies at your institution? (Mark the degree of use for each technology - - video, audio, and computer: ? = don't know; 0 = none; L = low; M = medium; H = high.)

Video		?	0	L	M	H
1. Social sciences	1.					
2. Humanities	2.					
3. Physical and biological sciences	3.					
4. Computer science	4.					
5. Math	5.					
6. Business	6.					
7. Engineering	7.					
8. Medicine	8.					
9. Law	9.					
10. Other (describe)	10.					

Audio		?	0	L	M	H
1. Social sciences	1.					
2. Humanities	2.					
3. Physical and biological sciences	3.					
4. Computer science	4.					
5. Math	5.					
6. Business	6.					
7. Engineering	7.					
8. Medicine	8.					
9. Law	9.					
10. Other (describe)	10.					

Computer		?	0	L	M	H
1. Social sciences	1.					
2. Humanities	2.					
3. Physical and biological sciences	3.					
4. Computer science	4.					
5. Math	5.					
6. Business	6.					
7. Engineering	7.					
8. Medicine	8.					
9. Law	9.					
10. Other (describe)	10.					

C. Does your institution use video, audio or computer technologies to deliver specially-targeted instruction to any of the following special populations on or off campus? (Mark all that apply.)

		On	Off
1. Professionals - white collar	1.		
2. Workers - blue/pink collar	2.		
3. Handicapped or homebound	3.		
4. Older adult (age 55 plus)	4.		
5. Rural adults	5.		
6. High school dropouts	6.		
7. Incarcerated	7.		
8. Women	8.		
9. Blacks	9.		
10. Hispanics	10.		
11. American Indians	11.		
12. Eskimo	12.		
13. Asian-Americans	13.		
14. Other (describe)	14.		

D. What types of communities does your institution serve via information technologies? (Mark all that apply.)

1. Central city	1.
2. Suburbs (close in)	2.
3. Suburbs (distant)	3.
4. Metropolitan area	4.
5. Small city	5.
6. Rural (non-farm)	6.
7. Rural (farm)	7.
8. Don't know	8.
9. Other (describe)	9.

E. Approximately what percentage of the learners served by your institution each year make use of video, audio or computer technologies in their instructional programs? (Mark one percentage for each technology: ? = don't know; 0 = none.)

	?	0	1-10%	11-20%	21-40%	41-60%	61-80%	81-100%
1. Video	__	__	__	__	__	__	__	__
2. Audio	__	__	__	__	__	__	__	__
3. Computer	__	__	__	__	__	__	__	__

F. Approximately how many enrollments do you have in video and audio telecourses per year? (Mark the number for each type.)

	0	1-50	51-100	101-250	251-500	501-1000	1001-2000	2001-5000	Over 5000
1. Video	__	__	__	__	__	__	__	__	__
2. Audio	__	__	__	__	__	__	__	__	__

G. Does your institution produce any of the following types of print or electronic courseware for lease or purchase by other institutions? (Mark one for each type: ? = don't know.)

		?	No	Yes
1. Video telecourses or segments	1.	__	__	__
2. Audio telecourses or segments	2.	__	__	__
3. Computer software	3.	__	__	__
4. Other (describe)	4.	__	__	__

_____

H. Approximately what percentage of your faculty members receive special orientation or training in the use of information technologies? (Mark one percentage: ? = don't know; 0 = none.)

	?	0	1-5%	5-10%	11-25%	26-50%	51-75%	76-100%
1.	__	__	__	__	__	__	__	__

I. Does your institution offer special incentives or rewards to encourage faculty to get involved in the use of information technologies? (Mark one.)

1. Don't know __ 2. No __ 3. Yes __

J. Has your institution created any task forces or study groups to assess institutional policies and plans regarding information technologies?

1. Don't know __ 2. No __ 3. Yes __

4. Factors Affecting the Use of Information Technologies

A. There are many factors that can hinder efforts of an institution to more effectively utilize information technologies. To what extent are the following potential hinderances obstacles for your institution? (Mark one for each obstacle: ? = Don't know; No = not an obstacle; Min = minor obstacle; Maj = major obstacle.)

		Obstacles ?	No	Min	Maj
1. Inadequate information about current educational applications of information technologies by other colleges and universities.	1.	__	__	__	__
2. Lack of courseware available that meets the institution's academic needs and standards.	2.	__	__	__	__
3. Lack of reliable evaluative information about available media courseware.	3.	__	__	__	__
4. Faculty who are unsympathetic to the use of video and audio technologies.	4.	__	__	__	__
5. Faculty who are unsympathetic to the use of computer technology.	5.	__	__	__	__
6. Inadequate rewards and incentives to encourage faculty to get involved with the technologies.	6.	__	__	__	__
7. Administrators who are unsympathetic to the use of information technologies.	7.	__	__	__	__

	?	No	Min	Maj
8. Inadequate financial resources to obtain necessary hardware and software.	8.			
9. Logistical complexities involved in supporting students learning off-campus via technology.	9.			
10. Inadequate cooperation from public broadcasting agencies	10.			
11. Inadequate cooperation from cable television companies.	11.			
12. Inadequate knowledge about information technology on the part of the state policy-makers (e.g., legislators).	12.			
13. Inadequate advice and support from state policy-makers.	13.			
14. Unwillingness of educational institutions in the area to cooperate with one another to use the technology.	14.			
15. Other (describe) _____ _____	15.			

B. How important would it be to your institution if higher education policy-makers in your state government took the following actions to facilitate more effective use of information technologies? (Mark one for each action: ? = don't know; No = not important; IM = important; VIM = very important.)

	Action			
	?	No	IM	VIM
1. Improvements in funding formulas for enrollment in courses using information technologies.	1.			
2. Incentive programs to encourage greater faculty involvement in information technology.	2.			
3. Policies which encourage collaborative use of information technologies by numerous institutions.	3.			
4. Additional financial support for acquisition of information technology hardware and courseware.	4.			
5. Advocacy for the interests of institutions in their dealings with broadcasters, cable companies, vendors.	5.			
6. Other (describe) _____ _____	6.			

C. How important would it be to your institution if your local or state public broadcasting agency took the following actions to facilitate more effective use of video and audio instruction? (Mark one for each action: ? = don't know; No = not important; IM = important; VIM = very important.)

	Action			
	?	No	IM	VIM
1. Allocated more broadcast time for higher education programming.	1.			
2. Reduced the costs for educational use of airtime	2.			
3. Increased the selection of courses from which educators could choose.	3.			
4. Gave educators greater input in course selection	4.			
5. Increased incentives for collaboration among colleges and universities (e.g., group buys of telecourses).	5.			

	?	No	IM	VIM
6. Developed telecourse production projects in collaboration with colleges and universities.	6.			
7. Provide additional means of distributing courseware (eg. video cassette, satellite video disk, cassette, etc.)	7.			
8. Other (describe) _____	8.			

D. The organizations conducting this survey would like to assist educational institutions in their efforts to cooperatively make more effective use of the technologies. How important to your institution are the following areas for potential collaboration? (Mark one for each action: ? = don't know; No = not important; IM = important; VIM = very important.)

	Action ?	No	IM	VIM
1. Information sharing with other educators who are using information technologies	1.			
2. Networking with colleagues at other institutions regarding applications of technology to specific educational problems (e.g., serving remote learners).	2.			
3. Networking with colleagues regarding experiences in acquiring and using hardware and courseware.	3.			
4. Orientation and training opportunities for faculty and staff.	4.			
5. Orientation and training for state-level educational policy-makers.	5.			
6. Shared lease or purchase of video, audio or computer courseware.	6.			
7. Shared development of such courseware.	7.			
8. Shared use of existing locally-developed courseware.	8.			
9. Shared preview and evaluation of available courseware.	9.			
10. Other (describe) _____	10.			

5. **Special Features and Plans**

A. What are the most noteworthy or unique features about the ways your institution uses information technologies?

B. What problems (not indicated above) has your institution encountered in the process of using these technologies?

C. What future plans do you have for the use of information technologies at your institution? In the short-run and the long-run?

D. In what curriculum areas do you see the need for more courseware?

E. What are the names of any special programs at your institution that make extensive use of information technologies? (e.g., College of the Air, Audio Outreach, Microcomputer Laboratory).

F. Contact Person(s) for further inquiries:

Name _____
Title _____
Institution _____
Address _____
_____
Telephone ( ) _____

Name _____
Title _____
Institution _____
Address _____
_____
Telephone ( ) _____

Please return questionnaire to:

Richard Jonsen, Deputy Director
Western Interstate Commission for
Higher Education
P. O. Drawer P
Boulder, Colorado 80302

Please refer questions regarding this questionnaire to: Richard Markwood
(303) 497-0220

© Copyright. The Western Interstate Commission for Higher Education, 1984. All rights reserved.

Appendix C

SHEEO SURVEY QUESTIONNAIRE

Please return to WICHE by October 31, 1984

ALASKA ARIZONA CALIFORNIA COLORADO HAWAII IDAHO MONTANA
NEVADA NEW MEXICO OREGON UTAH WASHINGTON WYOMING

WICHE
Improving Education in The West

PACIFIC MOUNTAIN NETWORK

INFORMATION TECHNOLOGIES

Survey of Instructional Uses
State Higher Education Executive Officers

WICHE and PMN have recently collaborated on a survey on the use of video, audio, and computer technologies in the delivery of higher education coursework by institutions in their member states. WICHE and PMN are attempting to provide opportunities for collaboration, networking, and mutual support. This questionnaire, being sent to State Higher Education Executive Officers, is a further attempt to understand the policy implications and to gather information to aid in policy development related to this rapidly growing field.

Definitions of some terms used in the survey:

Consortium (formal): a contractual collaborative relationship between two or more organizations.

Consortium (informal): an ongoing noncontractual collaborative relationship between two or more organizations.

Courseware: the print and electronic media components of instruction delivered by video, audio, or computer technology.

Information technologies: a general term used in this survey to refer to all audio, video, and computer technology.

Network: a general term used to refer to two-way communications among educators via electronic or conventional means.

Telecourse: a combination of print and electronic (video or audio) components that are designed to provide a student with the equivalent of a regular classroom based course. Texts and student study guides are generally accompanied by roughly 10-15 hours of video or audio instruction and some classroom experience.

I. Information Technologies

A. How would you characterize the level of knowledge your agency has about the nature and extent of use of information technologies in instructional applications in institutions in your state (check one category for each technology)?

Technology	None	Minimal Knowledge	Working Knowledge	Comprehensive Knowledge
1. Audio	___	___	___	___
2. Video	___	___	___	___
3. Computer	___	___	___	___

B. How would you characterize the level of knowledge your agency has about the nature and extent of use of information technologies in administrative applications in institutions in your state (check one category for each technology)?

Technology	None	Minimal Knowledge	Working Knowledge	Comprehensive Knowledge
1. Audio	___	___	___	___
2. Video	___	___	___	___
3. Computer	___	___	___	___

C. Strategic planning

1. Is there, within your state, one or more task forces developing policies or plans for local or statewide development of information technologies (check all that apply)?

	Local Task Forces	Statewide Task Force
a. Audio	___	___
b. Video	___	___
c. Computer	___	___
d. Information technologies in general	___	___
e. Other	___	___

2. Does your agency have a statewide higher education master plan for information technologies (video, audio, and/or computer)?

Yes _____ No _____ If yes, is it

a. Part of working master plan? _____

b. The product of a special planning task force? _____

c. The future product of a special planning task force? _____

d. Other? _____

3. Describe any actions your agency is taking to encourage within your institutions strategic planning for development and deployment of information technologies in those institutions.

D. If WICHE were to provide to the SHEEO services related to the area of information technologies, which of the following would be most valuable (rank 1 = most important, 2 = next most important, ... 6 = least important)?

1. Facilitate networking (i.e., putting people in touch--see definitions p. 1). _____

2. Establish networks. _____

3. Periodically update and disseminate a survey of instructional uses. _____

4. Develop model policy guidelines for states. _____

5. Develop model policy guidelines for institutions. _____

6. Develop model planning for institutions. _____

G. Who within your office or state government has responsibility for planning or review of coordination of information technologies of institutions?

_____

Name Title

_____

Address

II. Policy Matters Affecting the Use of Information Technologies

A. There are many factors that can hinder efforts of institutions to more effectively utilize information technologies. Which of the following potential hindrances are obstacles for institutions within your state? Note: we are asking for the SHEEO perception; we have surveyed institutions on similar issues. (Mark one for each potential hindrance: ? = Don't know; No = not an obstacle; Min = minor obstacle; Maj = major obstacle.)

Potential hindrance	Obstacles ?	No	Min	Maj
1. Inadequate information about current educational applications of information technologies by other colleges and universities.				
2. Lack of reliable evaluative information about available media courseware.				
3. Inadequate rewards and incentives to encourage faculty to get involved with the technologies.				
4. Administrators who are unsympathetic to the use of information technologies.				
5. Inadequate financial resources to obtain necessary hardware and software.				
6. Logistical complexities involved in supporting students learning off-campus via technology.				
7. Inadequate cooperation from public broadcasting agencies.				
8. Inadequate cooperation from cable television companies.				
9. Inadequate knowledge about information technologies on the part of the state policy makers (e.g., legislators).				
10. Inadequate advice and support from state policy makers.				

	Obstacles ?	No	Min	Maj
11. Inabilities (because of tradition, lack of appropriate mechanisms, funding procedures, etc.) of educational institutions in the area to cooperate with one another to use the technology.	___	___	___	___
12. Other (describe)	___	___	___	___

_____

_____

B. How important do you think it would be to institutions of your state if appropriate policy makers (not necessarily the SHEEO) took the following actions to facilitate more effective use of information technologies? (Mark one for each action: ? = don't know; No = not important; IM = Important; VIM = very important.)

Action	Importance ?	No	IM	VIM
1. Implement modified funding formulas for enrollment in courses using information technologies (i.e., that acknowledge differences in student/faculty ratios, start-up costs, plant utilization, etc.).	___	___	___	___
2. Recommend modified faculty reward systems to encourage greater faculty involvement in information technologies.	___	___	___	___
3. Recommend modified faculty workload policies and provisions that reflect unique problems of electronic courseware development.	___	___	___	___
4. Implement policies which encourage collaborative use of information technologies by numerous institutions.	___	___	___	___
5. Budget additional financial support for acquisition of information technologies hardware and courseware.	___	___	___	___
6. Coordinate advocacy for the interests of institutions in their dealings with broadcasters, cable companies, vendors.	___	___	___	___
7. Other (describe)	___	___	___	___

_____

_____

_____

C. WICHE and PMN would like to assist educational institutions in their efforts to cooperatively make more effective use of the technologies. How important is it to your agency to collaborate in the following activities? (Mark one for each action: ? = don't know; No = not important; IM = important; VIM = very important.)

Collaborative activity	Importance ?	No	IM	VIM
1. Information sharing with other educators who are using information technologies.	___	___	___	___
2. Networking with other SHEEOs regarding applications of technology to specific educational problems (e.g., serving remote learners).	___	___	___	___
3. Networking with other SHEEOs regarding experiences in acquiring and using hardware and courseware.	___	___	___	___
4. Cooperating with other SHEEOs and higher education institutions in orientation and training opportunities for faculty and staff.	___	___	___	___
5. Cooperating with other SHEEOs in orientation and training of other state-level educators and policy makers.	___	___	___	___
6. Cooperating with other SHEEOs in shared lease or purchase of video, audio or computer courseware.	___	___	___	___
7. Cooperating with other SHEEOs in promoting shared development of such courseware.	___	___	___	___
8. Cooperating with other SHEEOs in providing for shared use of existing locally developed courseware.	___	___	___	___
9. Cooperating with other SHEEOs in encouraging shared preview and evaluation of available courseware.	___	___	___	___
10. Other (describe)	___	___	___	___

_____

_____

D. About what policy areas related to information technologies (e.g., credit transfer, accreditation, etc.) do you feel you need more information?

E. In what areas related to information technologies do you feel there is most urgent need for research and analysis?

F. The capability of remote delivery via information technologies creates a new level of issues at the state level which have customarily been addressed at the institutional level (i.e., issues involving courses, programs, and instructional delivery), how do you perceive your role in this new level?

G. Ideally, what mechanisms should be established at the state level to best coordinate the use of information technologies?

H. What state mechanisms or incentives should be established to encourage institutions to cooperate and collaborate in the use of information technologies? (Cooperation and collaboration could include budgetary, programmatic, and structural matters.)

I. What mechanisms should be established to coordinate interstate consideration related to information technologies?

J. How should evaluation of traditional classroom education be modified in order to adequately evaluate electronically enabled instruction?

K. Other policy questions

_____

_____

_____

III. Special Features and Plans

A. In addition to actions mentioned in I.C.3, what policies has your agency enacted to encourage more effective and/or extensive use of information technologies in your state?

B. What are the most noteworthy or unique features about the ways your agency plans for or determines needs for uses of information technologies among your institutions?

C. What are the peculiar or unique problems you have encountered in the process of making and carrying out policies related to information technologies?

D. Describe briefly the plans for educational use of information technologies within your state--in the short-run and in the long-run?

short-run

long-run

Appendix D

NORTHWEST TASK FORCE ON HIGHER EDUCATION INFORMATION TECHNOLOGIES

ALASKA

Ed Cridge
Head, Instructional Media Production
and Communication Technology Dept.
University of Alaska, Fairbanks

*Jane Demmert
Director for Instructional
Telecommunications Consortium
University of Alaska, Fairbanks

Robert Geiman
Director of Libraries and
Media Services
University of Alaska, Fairbanks

Kerry D. Romesburg
Executive Director
Alaska Commission on
Postsecondary Education

IDAHO

*Jerry Garber
General Manager
Idaho Educational Public
Broadcasting System

Ben Hambelton, Director
Educational Media Services
Boise State University

Harvey Hugnett
Manager
Media Center
University of Idaho

Vicki Kreimeyer
Associate Director for
Library Services
Idaho State Library

MONTANA

Kay Welling Garcia
Director
Office of Continuing Education for
the Health Professional
Montana State University

*William J. Lannan
Director of Special Projects
Montana University System

Sue Spencer
Director
Center for Continuing Education
University of Montana

OREGON

Doug Collins
Deputy Director
Oregon State Scholarship Commission

Jim Ellison
Dean of Liberal Arts and
Telecommunications
Lane Community College

*Steve Jonnson
Coordinator, Instructional Programs
Oregon Public Broadcasting

T.K. Olson
Executive Director
Oregon Education Coordinating
Commission

*Bud Paulson
Teaching Research
Western Oregon State College

Holly Zanville
Assistant Vice Chancellor for
Academic Affairs
Oregon State System of
Higher Education

WASHINGTON

William Chance
Executive Director
Temporary Committee on Education
Policy, Structure and Management
Evergreen State College

WASHINGTON continued

Margaret Chisholm, Director
Graduate School of Library and
Information Science
University of Washington

*Ron Crossland
Associate Director
Educational Services
State Board for Community
College Education

Bob Gillespie
Gillespie, Folkner
and Assoc., Inc.

Greg Golden
Director, Resource Center
Edmonds Community College

Bill Hevly
Director of Instructional
Media Services
University of Washington

Neal Robison
Director of Instructional
Telecommunications
Washington State University

*Marlena Scordan-Weglin
Director, Media Systems
Continuing Education
University of Washington

Charles Vlcek
Director
Instructional Media Center
Central Washington University

Pat Woodley
Director of Marketing and
Telecommunications, KCTS
University of Washington

*Steering Committee